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HOOKER'S

JOURNAL OF BOTANY

AND

KEW GARDEN MISCELLANY.

EDITED BY

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Definitions of Rare or hitherto Undescribed AUSTRALIAN PLANTS, *chiefly collected within the boundaries of the Colony of* Victoria; *by* Dr. FERDINAND MUELLER, Government Botanist for the Colony of Victoria.

At the moment of Dr. Mueller's departure on the Exploring Expedition to North-west Australia, we have the pleasure to receive from him the following descriptive characters of some of his many interesting discoveries. These have indeed appeared in the 'Transactions of the Victoria Institute and of the Philosophical Society of Victoria, 1854–5,' but as that work is likely to fall into the hands of few European botanists, we are anxious to do all in our power to make these discoveries known to them. It is more than probable that when the plants here defined come to be compared with the collections in our extensive Herbaria in this country, some of them will be found to be already described; but that must be a work of time. In the meanwhile, we give the account in the Author's own words.—ED.

I. RANUNCULACEÆ.

1. Ranunculus *Millani*, F. Muell.; dwarf, stemless; root fasciculate-fibrous; scape simple, one-flowered, solitary, spreading-downy, of the length of or shorter than the petioles; leaves pinnatisect, glabrous or,

together with the upper part of the petioles, scantily downy; segments few, linear, undivided or bi-trisect, terminated by a gland; sepals appressed, glabrous, nearly ovate, with membranous margins; petals five to ten, white, obovate to oblong-cuneate, almost twice as long as the calyx; nectar-pit distant from the base, margined, covered by a hardly perceptible scale; carpels few, glabrous, broad-ovate, compressed, margined, smooth, with a hooked style.

HAB. In gravelly places on most of the summits of the Australian Alps, irrigated by the melting snow.

I should have referred this neat little plant to the Tasmanian *R. nanus*, were the discrepancy in the colour of the petals, a character of such validity in this genus, not too manifest; for whilst to that species bright yellow petals are attributed, I found them always white in this, and assuming only a slight yellow tinge when drying.

In selecting the specific name, I desire to pay a slight tribute to the scientific merits of A. M'Millan, Esq., who not only forced with skill and enterprise his way first into Gipps' Land, opening one of the finest districts in the whole of Australia to civilization, but also named and ascended Mount Wellington, where I became originally acquainted with this plant.

2. Ranunculus *anemoneus*, F. Muell.; glabrous or hirsute; root fasciculate; stem thick, simple, erect, one- to three-flowered, below leafless, at the base vaginate; leaves veined, the radical ones on long and strong petioles, orbicular, divided to the base into three or five lobes, these deeply three- to five-cleft, covering each other, their lobules variously cut, acute; bracteal leaves large, cordate-orbicular, dissected, sessile, clasping; peduncle naked, or with a smaller bracteolar leaf; sepals five to seven, ovate, appressed, slightly villous; petals large, white, generally numerous, twice or three times as long as the calyx, narrow oblong-cuneate, entire; nectar-pits solitary, margined; carpels turgid, even, glabrous, margined; the style hooked at the extremity.

HAB. On springs at the summit of the Munyang Mountains.

This charming and interesting species forms, after *Grevillea Victoriæ*, Muell., the greatest ornament to the snowy mountains of continental Australia. It differs from the similarly showy species of New Zealand in its white petals, and approaches rather to the European alpine type of the genus represented by *R. aconitifolius*, *glacialis*, etc.

3. Myosurus *Australis,** F. Muell.; scape filiform or setaceous, upwards but slightly thickened; petals and sepals very small; fruit-spike narrowly terete, somewhat acute, about an inch long; carpels numerous, closely intricate, rhomboid or almost deltoid, acuminate at the thickened base, slightly spreading; styles very short.

Hab. On moist places or on the open plains where rain-water lodges for a considerable time, near the Emu Creek, Hopkins River, Avoca, Avon, Richardson, and Murray, sometimes abundant.

It is not a little surprising that this genus, of which hitherto only two species, namely, *M. minimus* from Europe, and *M. aristatus* from the Cordilleras of Chili, have been noticed, should find its representative also in Australia. Our species is closely allied to *M. minimus;* it differs chiefly in the loose extra-curved bases of the carpels.

4. Caltha *introloba*, F. Muell.; dwarf; leaves on long petioles, hastate-ovate, notched at the summit, perfectly entire, enlarged at the base by two long lobes; these bend inward, are oblong-linear and dilated below; scape one-flowered, very short; sepals white, five to eight, deciduous, linear-lanceolate, acuminate; carpels five to nine, with three seeds in each, and a long straight style, reflexed at the top.

Hab. On gravelly places on the Australian Alps, irrigated during the summer months by the melting snow. Mount Hotham, Mount Latrobe, and Munyang Mountains.

Distinguished from *C. Novæ-Zelandiæ* principally by its white flowers and longer leaf-lobes. It is the only known New Holland species.

II. Cruciferæ.

5. Cardamine *laciniata*, F. Muell.; perennial, erect, glabrous; leaves nearly all radical, on long petioles, lanceolate, remotely toothed or laciniate or sometimes pinnatipartite; flowers in the raceme remote; petals oblong-cuneate, hardly twice as long as the sepals; siliquas as well as their pedicels spreading; style short; seeds brown, slightly wrinkled.

Hab. On moist grassy as well as on boggy places, along rivers and creeks; it often indicates a saline soil.

6. Cardamine *eustylis*, F. Muell.; dwarf, glabrous or somewhat downy; root creeping; stem thin, upwards naked; leaves petiolate, pinnatisect; segments five to seven, ovate or oblong, lobulate or with a few teeth, the terminal one the largest, the inferior ones narrowed

* Apparently not different from *M. minimus*, L.—Ed.

into the base; pedicels at length remote, spreading; petals shorter than the calyx; style longer than the diameter of the spreading siliqua.

HAB. On moist sandy places on the Murray River, in South Australia.

Not unlike *C. sarmentosa*, Forst.

7. Sisymbrium (§ Arabidopsis) *cardaminoides*, F. Muell.; annual, diffuse, somewhat hairy; leaves lanceolate, entire or on both sides with one or two teeth; pedicels expanded, hardly half as long as the siliqua; nerve of the valves thin; petals white; filaments linear-subulate; style short; stigma indistinctly bilobed.

HAB. On sand-ridges near the entrance of the Murray River.

8. Sisymbrium *trisectum*, F. Muell.; suffruticose, glabrous, erect; leaves glaucous, divided into three linear, filiform segments; pedicels thread-like, three or four times shorter than the siliqua, slightly spreading; style very short or wanting; stigma dilated.

HAB. In the desert on the Murray River, on Spencer's and St. Vincent's Gulf, and near Lake Torrens.

9. Capsella (§ Hutchinsia) *antipoda*,* F. Muell.; annual; stems simple or little branched, ascending, foliate; leaves all petiolate, pinnately parted or entire, glabrous; lateral lobes two or three on each side, ovate or oblong, the terminal one larger; petals white, ovate, unguiculate; calyx for some time persistent, half as long as the corolla; silicles elliptical, shorter than the pedicels, 4–12-seeded; stigma subsessile.

HAB. In the Black Forest, and on the summit of Mount Alexander. Of great affinity with *Hutchinsia petræa.*

10. Lepidium (§ Dileptium) *ambiguum*, F. Muell.; perennial; stem upright, branched, somewhat scabrous; upper leaves linear, entire or with a tooth at the apex and with a broad basis, sessile; flowers furnished with petals; silicles of the length of the pedicels, ovate-oblong, attenuated at the apex, with a very short emarginature, which includes the subsessile stigma.

HAB. On the Murray River in South Australia. Allied to *Lepidium hyssopifolium;* silicles two lines long.

11. Lepidium (§ Lepia) *monoplocoides*, F. Muell.; perennial; stems upright or ascending, branched, scabrous from small papulæ; leaves

* Probably *H. petræa,* which is found both in South-eastern Australia and in Tasmania, or *H. Australis,* H.f. Fl. Tasman.

linear, entire, slightly tapering into the base; flowers without petals; silicles orbicular, acuminate, with a broad keel, a little longer than the flat pedicel, their lobules connivent, surpassing in length the style.

HAB. In the Mallee Scrub on the Murray River, towards the junction of the Murrumbidgee.

A rare species, almost intermediate between *Lepidium* and *Monoploca.*

12. Monoploca *leptopetala,* F. Muell.; fruticulose; branches numerous, scabrous; leaves semiterete; petals lanceolate-linear, long acuminate; silicles ovate, of equal length with the pedicel; their lobules at the extremity connivent, half as long as the style.

HAB. In the Murray desert, not unfrequent.

13. Stenopetalum (§ Camelinella) *sphærocarpum;* glabrous; stems filiform; lower leaves of the stem tripartite, their segments and the upper leaves linear, entire; pedicels filiform, nodding, longer than the calyx; petals white, exceeding with its linear curled appendage twice the sepals; silicles globose, nerveless, hardly of the length of the pedicel; each cell containing from six to eight seeds; funicles shorter than the seeds.

HAB. On moist sandy places on the Murray River, at Lyndoch Valley, Crystal Brook, and various places on Spencer's Gulf.

14. Blennodia *alpestris,* F. Muell.; perennial, dwarf; stems erect, nearly naked, thinly pubescent, rarely branched; leaves lanceolate or ovate, toothed or nearly entire, gradually tapering into the petiole; flowers white, corymbose; style short; pedicels divaricate, of the length of the siliqua; valves distinctly one-nerved; seeds disposed in two rows, brown, minutely foveolate.

HAB. In subalpine grassy places at the sources of the Murray and Snowy Rivers.

Erysimum brevipes, curvipes, blennodes (*B. lasiocarpa,* MSS.), are congeners of this plant, but as the cotyledons are at times slightly bent inward, I am uncertain whether the genus ought not to be united with *Diplotaxis* or *Moricandia.*

III. DROSERACEÆ.

15. Drosera *angustifolia,** F. Muell.; stem foliate, simple, decumbent or ascending; leaves scattered, nearly sessile, long and narrow, caudate, above and along the margins glandulose-pilose; racemes either

* Apparently the same as *D. serpens,* Planch.—ED.

opposite to or alternate with the leaves, hardly of their length; three- to ten-flowered, covered with short, gland-bearing hairs; segments of the five-parted calyx lanceolate, gradually narrowed upwards, about equal in length with the capsule, and half as long as the whitish petals; styles three, divided at the base, its divisions filiform, incurved at the top; seeds egg-shaped, clathrate.

HAB. On the moist gravelly margins of the lakes on the Murray River, towards Eustone.

This is the first extratropical species of this section of *Drosera* with which we are acquainted. It approaches *D. Finlaysoniana*, from Cochin China. This is however only one of many tropical forms of plants which, transgressing the torrid zone, advance as far south as the Murray Desert.

IV. POLYGALEÆ.

16. Polygala *veronicea*,* F. Muell.; stem suffruticose at the base, erect or diffused, nearly terete, hardly branched, as well as the peduncles and pedicels puberulous; leaves alternate, close to each other, soon smooth, the lower ones ovate or round, the upper ones lanceolate, acute, apiculate, net-veined, on very short petioles, and with a slightly recurved margin; racemes lateral and terminal, few-flowered; middle bracteole ovate-lanceolate, longer than the lateral ones, but much shorter than the pedicel; exterior sepals spreading, the interior ones ovate, contracted into a cuneate base, blunt, apiculate, glabrous, veined, of the length of the crested keel, and likewise of the roundish, obcordate, broad-winged, glabrous capsule; ovary tapering into a very short stalk; seeds ovate, sparingly hairy, twice the length of the strophiole.

HAB. In grassy or gravelly places, from King River to the Goulbourne River.

It is remarkable that since Brown noticed, in the Appendix to Flinders' Voyage, the presence of the genus *Polygala* in Australia, no Australian species has until now been described.

17. Comesperma (§ Disepalum) *polygaloides*,† F. Muell.; smooth; leaves approximated, flat, narrow or linear-lanceolate, acute, glaucous; raceme somewhat dense, purple; pedicels shorter than the flowers; lateral bracteoles about half as long as the intermediate one; lobes of

* Allied to some Asiatic species.—ED.

† Apparently very nearly allied to *C. virgata*, Lab.—ED.

the anterior sepal acute; carina gibbous at the top, hardly shorter than the wings.

HAB. In barren plains at the Avoca, Guichen Bay, and Encounter Bay. In habit approaching to *C. æmulum.*

V. PITTOSPOREÆ.

18. Marianthus *bignoniaceus*, F. Muell.; innovations silky; branches climbing, slightly pubescent, at length smooth; leaves patent, petiolate, out of an almost heart-shaped base, ovate, oblong or lanceolate, apiculate, net-veined, puberulous, above soon turning smooth, slightly hairy beneath; margins undulate, revolute, densely hairy, as well as the nerves; pedicels axillary, solitary or in pairs, rarely tribracteolate at the base, equal to or twice the length of the petiole, pubescent as well as the calyx; flowers pendulous; sepals lanceolate, acuminate, four or five times shorter than the cylindrical, somewhat bell-shaped, puberulous, orange-yellow corolla; anthers yellow; germen villous, silky; capsules narrow-elliptical, somewhat compressed, with a longitudinal furrow, bilocular, villous; cells many-seeded.

HAB. On shady rivulets, by cataracts, and in fissures of the rocks, in the Grampians, and Victoria and Serra Ranges; in South Australia, on the Onkaparinga, and in the Lofty Ranges.

This remarkable and beautiful species extends the geographical limits of the genus *Marianthus* to the eastern portion of this continent, and is the only one hitherto known from beyond the boundaries of Western Australia. At the Grampians it is accompanied with other features of the Swan River flora, as species of *Lepidobolus*, *Lhotzkya*, and *Calectasia*, not previously observed so far towards the east.

VI. CARYOPHYLLEÆ.

19. Colobanthus *pulvinaris*, F. Muell.; perennial, glabrous; stems numerous, moss-like, tufted; leaves densely crowded, rigid, squarrose, broad, subulate, channelled, triquetrous, pungent, shining, with a slightly inflexed mucro; sheaths close; flowers solitary, terminal, on very short and thick peduncles, pentamerous: sepals from a broad base lanceolate-subulate, hardly longer than the egg-shaped capsule, and nearly twice as long as the stamens.

HAB. On the highest and barest gravelly tops of the Munyang Mountains (6000–6500 feet).

This forms a near approach to *C. Benthamianus*, Fenzl. (*C. subulatus*, Hook. fil.), a native of Cape Horn and the Falkland Isles, though not found either in New Zealand or Tasmania, but is apparently identical with the pentamerous form of *C. Benthamianus* from Campbell's Island. Since also my plant invariably shows a quinary division of the flowers, I have separated it from the South American one, following Dr. Hooker's suggestions* in the 'Flora Antarctica,' p. 247.

VII. Malvaceæ.

New genus: Greevesia, Muell.—*Calyx* closed, at the full maturity of the fruit expanding into five segments, surrounded by five shorter lanceolate spreading bracteoles. *Petals* five, much shorter than the calyx, twisted, never expanded, adnate to the tube of the stamens, and concealed by the calyx. *Anthers* five, ovate, kidney-shaped, one-celled; pollen-grains obliquely ovate-spherical, echinulate. *Styles* ten, dilated into convex, at length penicillate, stigmas. *Carpidia* five, perfectly free, net-veined, indehiscent, one-seeded, oblique-ovate, slightly keeled. *Seeds* kidney-shaped, smooth, filling the cell.

This highly remarkable genus, which has been dedicated to Dr. Aug. Greeves, one of our warmest supporters of science, is as distinct from *Pavonia*, to which it ranks next, as from all other genera of this Order, and is well distinguished by its extraordinary character of covering with its perfectly connate sepals the little twisted corolla, which therefore does not see daylight until shrivelled up, and long after fecundation, when at length the calyx unfolds to set free the ripe carpels.

20. Greevesia *cleisocalyx*, F. Muell.

Hab. Discovered in eastern tropical Australia during Dr. Leichhardt's exploring expedition, by Mr. D. Bunce, and now cultivated in the Botanic Garden at Melbourne.

A small shrub, with oblong or ovate-cordate crenate leaves, which are covered underneath with a grey tomentum.

New genus: Howittia, F. Muell.—*Calyx* five-cleft, without an involucre, shorter than the petals. *Stamens* numerous, all separately emerging from the tube. *Anthers* kidney-shaped, one-celled. *Pollen*-grains globose, scabrous. *Styles* three, connate into one. *Stigma* club-

* The suggestion is no more than a question whether the tetramerous and pentamerous forms of this *Colobanthus* have not as good a title to be considered species, as *Spergula saginoides* has to be separated from *Sagina procumbens*.—Ed.

shaped, three-lobed. *Capsule* sessile, depressed, with three valves and three cells; valves bearing the septum in the middle; cells two-seeded, including at the top a slight quantity of woolly hair. *Axis of the capsule* persistent, thread-like. *Seeds* obovate, three-sided.

This new Malvaceous genus, which bears, in acknowledgment of his devotion to botany, Dr. Godfrey Howitt's name, is nearest related to *Lagunæa*, less to *Fugosia*.

21. Howittia *trilocularis*, F. Muell.

HAB. On bushy declivities around Lake King.

A flexile shrub, attaining the height of twenty feet; leaves ovate or oblong-lanceolate, with a heart-shaped base, above scabrous, beneath tomentose; stipules never distinctly developed; peduncles axillary, solitary, filiform, single-flowered; petals obovate, purplish.

22. Sida *intricata*, F. Muell.; fruticulose, upright or diffuse, much branched; leaves small, ovate-roundish, truncate at the top, toothed, but entire at the cuneate base, above scantily, beneath densely covered with grey stellate hairs; petioles much shorter than the leaves, often surpassing in length the subulate setaceous stipules; peduncles axillary, solitary, drooping, shorter than the leaves; segments of the calyx subdeltoid; carpels five, a little depressed, on the back almost even and puberulous, at the commissura netted; seeds brown, puberulous.

HAB. In sandy, loamy plains between Mount Hope and the Murray, also towards the Darling River.

This bears some affinity to *Sida corrugata*, but its growth is upright and intricate; it is much more robust, the flowers, leaves, and capsules are much smaller, the latter not rough.

23. Sida *humillima*, F. Muell.; suffruticose, procumbent; leaves thin, ovate-oblong, obtuse, cordate or rounded at the base, unequally and deeply crenate, above scantily, beneath densely covered with a stellate, somewhat shining indument; petioles hardly the length of the leaves, but longer than the subulate-linear stipules; peduncles axillary, solitary or two or three together, filiform, articulated near the middle, nearly equal to the length of the petiole; segments of the calyx subdeltoid, acute; carpels eight to ten, depressed, rough, at the commissure asperous;. seeds brown, smooth.

HAB. In dry plains on the Avoca and Murray. In South Australia, on St. Vincent's Gulf, and the Kapunda.

Not dissimilar to *Sida corrugata*.

24. Abutilon *Behrianum*, F. Muell.; stem herbaceous, upright, hardly branched, as well as the leaves covered with a velvet-like tomeut; leaves cordate, acuminate, repand or slightly crenate, about as long as the petiole; stipules linear-subulate, deciduous; peduncles axillary, solitary, one-flowered, or terminal with several flowers, articulated above the middle, often shorter than the petiole; segments of the calyx ovate-lanceolate, acute; carpels nine to twelve, tomentose-pubescent, compressed, oblique, ovate, aristate, with two to four black somewhat scabrous seeds.

HAB. In lagoons which become dry, and on the margins of lakes on the Murray, Loddon, Darling, and Murrumbidgee rivers.

25. Abutilon *otocarpum*, F. Muell.; fruticose, upright, all over grey-velutinous; leaves cordate-orbiculate, blunt, unequally crenate, of nearly equal length with the petiole; stipules linear, subulate, deciduous; peduncles axillary, solitary, one-flowered, towards the top articulate, but little surpassing the length of the petioles; segments of the calyx inflated, cymbiform, long-acuminate; carpels numerous, shorter than the calyx, very compressed, ear-shaped, nearly membranaceous, velutino-pubescent, with one to three black glabrous rough seeds.

HAB. Very rare, on sand-hills on the Murray, towards the junction of the Darling.

This *Abutilon* is allied to *A. halophilum* (F. Muell. in Linnæa, xxv. p. 381), from Spencer's Gulf.

VIII. BUETTNERIACEÆ.

26. Thomasia *petalocalyx*, Schlecht.

This is the *T. macrocalyx* of Schlechtendal (Linnæa, xx. p. 633), not of Steudel. Hispid with starry hairs; leaves petiolate, oblong, entire, blunt on the summit and rounded on the base; stipules large, foliaceous, oblique, ovate or half-cordate; racemes lateral, simple, few-flowered; segments of the hypocalycine bracteole lanceolate; petals five or wanting; germen short-downy, pointed; style glabrous, as long as the anthers, which are at the top short-dehiscent; capsule three-celled.

HAB. On coast rocks of Wilson's Promontory, on scrubby places of the Bugle Ranges, and on the Gawler and Murray Rivers. The first species known from the eastern portion of Australia.

27. Lasiopetalum *Behrii*, F. Muell.; leaves coriaceous, narrow-oblong,

obtuse, above at length perfectly smooth, beneath covered with a velvety grey-brown toment; cyme few-flowered, about as long as the opposite leaf; basilar bracteole linear, the upper one tripartite and half as long as the calyx, with unilateral linear scarcely unequal segments; laciniæ of the calyx outside starry grey-hairy, inside smooth, ovate-lanceolate, acute; germen blunt, white velutinous.

HAB. In the Mallee Scrub on the Murray River and St. Vincent's Gulf, where it was at first observed by Dr. H. Behr.

28. Corethrostylis *Schulzenii*, F. Muell.; leaves thin, cordate, somewhat acute, above asperulous, beneath grey-green and thinly tomentose; cyme about as long as the opposite leaf; bracteoles linear-filiform, undivided, solitary, the upper one a little remote from the calyx, which is whitish, almost membraneous, marcescent and not spotted; petals opposite to the filament, smooth or outward hairy; germen white from glandless velvet hair; style, with exception of the summit, densely retro-pilose.

HAB. In the Salt Flatt at Guichen Bay and on Mount Benson.

Intermediate between *C. membranacea* and *C. cordifolia* from the western coast of Australia, to which part of the country the genus was formerly considered to be restricted.

(To be continued.)

Dr. FERDINAND MUELLER *and the* NORTH AUSTRALIAN EXPLORING EXPEDITION.

In our last, or December Number of this Journal, we briefly mentioned the appointment of Mr. Mueller as Botanist to the above-mentioned Expedition. This judicious measure originated, we believe, with his Excellency the Governor-General of Australia, Sir William Denison, and a more fortunate choice could not have been made.

The exact destination or particular route of the party is probably known to few, save the Commander of the Expedition; but at a meeting of the Geographical Society, held on the 10th December, a letter was read from Mr. Kent, dated Sydney, August 12th, 1855, giving information respecting the North Australian Expedition, which had left Moreton Bay in August last, in a barque and a schooner. It was

under the command of Mr. Gregory, accompanied by his brother and by Messrs. Baines, Wilson, Mueller, Elsey, Hood, and fourteen men, with fifty horses, two hundred sheep, and provisions and stores for two years. Sir R. Murchison explained the projected course of this Expedition from Moreton Bay, by sea, to the mouth of the Victoria River, on the north-west coast. It was intended to ascend that river to its source, and determine the boundaries of the drainage towards the north coast to the interior. The Expedition, passing eastward, would probably skirt the northern limits of Sturt's Central Desert, and reach the head-waters of the rivers flowing into the Gulf of Carpentaria: thence it was hoped that it would be in a condition to penetrate, southwards, to the great head of the Bareo River, which was the northernmost point reached by Sir T. Mitchell and Mr. Kennedy, on their journeys from Sydney towards the Gulf of Carpentaria. These operations would greatly enlarge our knowledge of Northern Australia, and open up communication between it and the Southern Colonies.

Our first notice of the appointment of Dr. Mueller was from himself, as will be seen from the following extract of his letter to us, dated "Sydney, 12th July, 1855."

"This will probably be the last letter which I shall have the honour of addressing to you for a long time, since I have now definitely accepted the appointment of Botanist for the North Australian Expedition. I have accepted this appointment reluctantly, and only after his Excellency the Governor-General had expressed his opinion, that through your influence I might be permitted to retain a set of specimens to be formed during the Expedition, in order that I might describe what we may be able to add to botanical science. I sincerely trust that you, Sir William, will not let me pray in vain; for when I say that it would have been in my power to discover many hundred new plants in the meanwhile on the borders of the *settled* districts of Australia, without engaging in an expedition of such eminent dangers and privations, and that my fixed appointment in Victoria will probably render it difficult for me to visit England for the purpose of describing my collections, then I think you will agree with me in viewing my request as a just one; and I feel convinced, from former kindness which I experienced from you, that you would not wish I should sink to the position of a mere collector.

"I am so multifariously occupied with arrangements, that I can

add but little to this request; I will however state, that in case of my death I have made arrangements for my own private herbarium and collections, and the manuscripts of the Flora of Victoria, to be forwarded to England for publication."

Dr. Mueller's most just and reasonable request to be allowed to have a full set of his specimens for his especial use has been forwarded to us by the Colonial Office; and the Chief Secretary of the Colonies has not failed to grant his sanction to so modest a request from a true man of science, as Dr. Mueller is.

A second letter on this subject from Dr. Mueller,—showing that even in the environs of Sydney, in the midst of the bustle of preparation for a long and hazardous journey, he can collect information, if it be only in relation to the geographical limits of Australian plants, —will afford some interesting extracts. It is dated "On board the Monarch, off Moreton Bay, July 22, 1855."

"In a former letter addressed to you, I had only time to inform you that I was on leave of absence for eighteen months, without support from the Victoria Government, to resume my labours in Melbourne at the beginning of 1857. My favourite plan was to traverse, at my own expense, the interior districts of Eastern Subtropical Australia in the meanwhile, when I hoped to advance a little further our knowledge of Australian plants. Since however my private resources are reduced to almost nothing, I accepted the appointment as Botanist for the North Australian Expedition, which his Excellency the Governor-General had been pleased to confer upon me. Still I am far from expressing herewith, that financial reflections influenced me to embark in an expedition into tropical Australia. In fact it has been with very great reluctance that I accepted the appointment, dangerous as it is, not only with regard to our personal safety, but also perhaps to my position as a botanist. For if in any degree a comparison will be drawn between the results probably arising from botany in this expedition, and those which are generally gained in tropical peregrinations, I feel sure that I shall by no means satisfy your expectations. The scanty means of carrying the collections, the well-known hostility of the natives, and above all the aridity of the country, are likely to be so many obstacles in accumulating large collections of plants; nor can the share of new plants be great, if we are not able to reach elevated mountains in the interior, as the coast vegetation is already so well known through Robert Brown

and Allan Cunningham. It is however my utmost desire to get together as much of the treasures of the North Australian Flora as I possibly can; and I trust only that Providence will grant me life and health to bear the tropical heat, and the privations and fatigues which are inseparable from such journeys of discovery.

"I left Melbourne in the beginning of this month, and might have collected at that favourable season hundreds of plants in the environs of Sydney; but as only a few days were allotted to me for making my preparations, I was almost entirely deprived of the pleasure of botanical wanderings over the classical ground traversed by Banks and Solander and Robert Brown, where so much extensive information may be gained by studying the plants on the places where they were first discovered; and although you are so closely acquainted with every one of them, I think I may venture a few remarks on the specimens which I gathered in a walk on the north shore and along Botany Bay; for to any one who only saw the Flora of Victoria or South Australia, the increase or the diversity of *Epacrideæ*, *Diosmeæ*, *Proteaceæ*, *Restiaceæ*, and *Cyperoideæ* must be striking; nor can he fail to be surprised by the paucity of *Compositæ*. This remark can however only apply to the near vicinity of Sydney, for Mr. Moore, from whom I have gained much valuable information and manifold assistance during my brief stay, informs me that *Compositæ* are abundant to the westward, as may be reasonably expected. A large proportion of the plants, described at the beginning of this century, I saw for the first time then; and should the Flora of Victoria ever be continued by myself, it will be highly interesting to proceed from Sydney to Cape Howe, in order to trace the southern limits of many of the New South Wales plants. The boggy nature of the country, between the Snowy River and Cape Howe, frustrated my attempt to go so far east from Victoria. Of all natural orders in Australia *Diosmeæ* and *Proteaceæ* produce the most restricted plants as regards localities. Thus, all the following I had, for the first time, an opportunity of observing here:—*Zieria pauciflora*, *revoluta*, *Boronia ledifolia*, *B. pinnata*, *Crowea saligna*, *Eriostemon salicifolius*, *E. laxifolius*, *Philotheca*, *Conospermum longifolium*, *C. laxifolium*, *Isopogon anethifolius*, *I. anemonifolius*, *Petrophila pedunculata*, *Lomatia silaifolia*, *Xylomelum pyriforme*, several very fine *Grevilleas* and *Persoonias*, *Hakea gibbosa*, etc. The examination of these plants has not been without use to me; for instance, I found that my *Zieria pauci-*

flora, from Mount Maridon, differs from the true species, and may be named *Z. oligantha.* Also the *Leucopogon lanceolatus*, from Sydney, is distinct from *L. lanceolatus*, from Mount William (*L. neurophyllus*); but these discrepancies are not to be recognized by the perusal of the respective diagnoses. Touching here upon some alterations to be made in the names of former plants of my collections, I may at once also observe, that I had the good luck to review an incomplete set of Sir Thomas Mitchell's plants from tropical Australia, under care of Mr. Moore. *Eriostemon rhombeus* is identical with *E. gracilis*, Ferd. Muell. (an Graham?); the name is however hardly applicable to the general forms of this curious plant. *Conospermum Dallachii* appears to be your *C. sphacelatum*, and has therefore a range from subtropical Australia to beyond 38° S. To return to my Sydney plants, I may mention, as apparently rarer species, *Phyllanthus scaber*, *Monotaxis* sp., *Micranthemum ericoides*, *Hemigenia purpurea*, *Lycopodium laterale*, *Drosera spathulata* (exceedingly rare in Victoria), *Mitrasacme polymorpha*, *Epacris purpurascens* (never seen in South Australia or Victoria), *Aristida ramosa*, *Prasophyllum striatum*, *Pterostylis acuminata*, *P. concinna*, *Acianthus fornicatus*, *Cyrtostylis reniformis*, *Lagenophora pachyrhiza*, *Leptomeria acida*, *Leucopogon appressus*, *Styphelia longifolia*, *S. viridiflora*, *S. tubiflora* (this is really a charming bush), *Xerotes flexifolia*, *Leucopogon microphyllus*, *Darwinia fascicularis*, *Tetratheca ericæfolia*, *Polycarpon alsinifolium*, *Lasiopetalum ferrugineum*, *Marsdenia suaveolens*, *Callicoma serrata*, *Ceratopetalum*, *Angophora*, etc.

"The *Cyperoideæ* and *Grasses* were to me very interesting. *Carpha deusta*, which exhibits such singular structure, I dissected with pleasure. *Chorizandra sphærocephala*, *Chætospora paludosa*, *C. turbinata*, and others, I had never seen before. Amongst a few Grasses received from Richmond River, I observed *Sporobolus elongatus*, *Panicum Crus-galli*, *Cenchrus Australis*. *Galinsoga parviflora* is now also an Australian plant, being a troublesome weed in the gardens of Sydney.

"The Norfolk Island Pines in the Sydney Botanical Gardens are truly deserving admiration. Amongst the many fine trees of that establishment, I must not fail to notice the finest of all *Proteaceæ* which I know, namely *Stenocarpus Cunninghamii*, a small tree, embellished in this season with its superb flowers.

"I have lately seen what I take to be the true *Goodenia hederacea*; it widely differs from *G. cordifolia*, which I think, as being *truly*

alpine (a rare occurrence in the Order), deserves publication, unless De Vriese's new monograph should include it already.

"By the last Sydney mail I had the pleasure of forwarding a reprint of the botanical articles printed in 1854 and 1855 by the Victorian Institute and the Philosophical Society. Another copy will be brought to Kew by Mr. Winter. In the article on the alpine plants I omitted *Eurybia alpicola* and *E. megalophylla*, both not less beautiful than distinct. By the 'Francis Henty,' from Melbourne, I forwarded last month a complete set of specimens, including the *Duttonia*, which you promised to figure. A box was sent before by the 'George Marshall,' under care of a friend, Mr. Balfour Steward. Of the safe arrival of the sundries, per 'Great Britain,' I am anxious to hear. Any communications, please let be directed to C. Moore, Esq., Sydney Botanical Gardens, who will forward them to me, as my return to Melbourne may be uncertain for some time.

"My next letter to you will be despatched from the Victoria River, as the transport vessel is leaving us there to sail for Singapore, of which opportunity I will avail myself to report on my botanical results about Moreton Bay, and to give a sketch of the place of our disembarkation, such as the first impression may be able to convey.

"The third year's Report is with the Government, but not yet printed. Professor Harvey will return from his cruise in about a month.

"FERD. MUELLER."

Catalogue of MR. GEYER'S *Collection of Plants gathered in the* UPPER MISSOURI, *the* OREGON TERRITORY, *and the intervening portion of the Rocky Mountains; by* SIR W. J. HOOKER, D.C.L., F.R.A. *and* L.S.

(*Continued from* vol. vii. p. 378.)

1. Sporobolus *littoralis?* Kunth. Vilfa tenacissima, *Hook. Fl. Bor. Am. v. 2. p.* 239, *not H.B.K.*

HAB. Sandy tracts, valley of Upper Platte. June, July. *n.* 188.

2. Sporobolus *Virginicus*, Kth. Agrost. p. 210. Agrostis, *L.*

HAB. Stony, barren places along rivulets and in dry watercourses, plains of Spokan and Pelouse Rivers. July. *n.* 556.

1. Agrostis *laxiflora*, Richardson.—Hook. Fl. Bor. Am. vol. ii. p. 240.

HAB. Crevices of granite rocks in the water, Spokan River. July. *n.* 572.

2. Agrostis *Cornucopiæ*, Fras. Kth. Agrost. p. 221.

HAB. Moist, fertile meadows of Upper Clarke River, and Spokan Plains, Oregon. September. *n.* 86 and 355.

1. Calamagrostis *Canadensis*, Beauv.—Hook. Fl. Bor. Am. vol. ii. p. 240.

HAB. Meadows, Black's Fork, Upper Colorado. August. *n.* 28.

2. Calamagrostis *stricta*, Beauv.—Hook. Fl. Bor. Am. vol. ii. p. 240.

HAB. Grassy slopes, under Pine-trees, Spokan Mountains. July. *n.* 527 and 130.

1. Spartina *polystachya*, Willd.—Hook. Fl. Bor. Am. vol. ii. p. 242.

HAB. Fertile borders, Platte Fork of Upper Colorado, near Fort Vasco, rare. August. *n.* 259.—Saline, clayey, exsiccated places, valley of Upper Platte. June. *n.* 187.

1. Deschampsia *cæspitosa?* Beauv.—Hook. Fl. Bor. Am. vol. ii. p. 242.

HAB. Wet rocky prairies, on the high plains of Upper Oregon. June. *n.* 568.

1. Aira *elongata*, Hook. Fl. Bor. Am. vol. ii. p. 243. t. 227.

HAB. Rocks and stony swamps, and sides of rivulets, Kooskooskie Valley. June. *n.* 342 and 490.

1. Danthonia *spicata*, DC.—Hook. Fl. Bor. Am. vol. ii. p. 1244.

HAB. Rocks in the mountains of Upper Sweet-water, fringing the crevices; also in Platte and Upper Columbia. July. *n.* 189.

1. Poa *pratensis*, L.—Hook. Fl. Bor. Am. vol. ii. p. 246.

HAB. Cœur d'Aleine. *n.* 359.

2. Poa *serotina*, Ehrh. P. crocata, *Mx.—Hook. Fl. Bor. Am. v.* 2. *p.* 246.

HAB. Rocky banks of rivulets, Kooskooskie. June. *n.* 12 and 359.

3. Poa *Michauxii*, Kth. Brizopyrum boreale, *Nees.—Hook. Fl. Bor. Am. v.* 2. *p.* 254.

HAB. Saline, exsiccated, depressed situations in the valley of Lower Platte.

1. Glyceria *nervata*, Trin.—Hook. Fl. Bor. Am. vol. ii. p. 248. G. Michauxii, *Kth.* Poa nervata, *Mx.*

HAB. Swampy meadows, Kooskooskie Valleys. July. *n.* 497.

1. Reboulea *gracilis*, Kth.—Hook. Fl. Bor. Am. vol. ii. p. 249.

HAB. Gravelly banks of rivulets, Kooskooskie Valley. July. *n.* 508.

1. Koeleria *cristata*, Pers.—Hook. Fl. Bor. Am. vol. ii. p. 249.

HAB. High volcanic plains of the Spokan River, in Pine-woods, and rocky banks of rivulets, Kooskooskie Valley. June, July. *n.* 357 and 537.

1. Festuca *ovina*, L.—Hook. Fl. Bor. Am. vol. ii. p. 250.

HAB. One of the principal Grasses in the plains of Upper Missouri and Oregon. June. *n.* 356.

2. Festuca *bromoides*, L.

HAB. Stony, loamy, denuded places, Kooskooskie Valley. June. *n.* 358.

3. Festuca *tenella*, Willd.—Pursh, Am. vol. i. p. 83.

HAB. Barren, stony, loamy places, Kooskooskie Valley. June. *n.* 360.

1. Bromus *Oregonus*, Nutt.

HAB. Sandy moist meadows, Upper Missouri and Oregon territories. June, July. *n.* 244.

1. Triticum *repens*, L.—Hook. Fl. Bor. Am. vol. ii. p. 254, var.

HAB. Plains of Upper Missouri. July. *n.* 192.

1. Elymus *arenarius*, L.—Hook. Fl. Bor. Am. vol. ii. p. 255.

HAB. Grassy borders of rivulets, Spokan Plains. July. *n.* 541.

2. Elymus *Canadensis*, Mühl.—Hook. Fl. Bor. Am. vol. ii. p. 225.

HAB. Grassy rivulets, valley of Spokan River. July. *n.* 570.

1. Polyantherix *Hystrix*, Nees. Asprella, *Humb.*—Hook. Fl. Bor. Am. vol. ii. p. 256.

HAB. Saline, inundated, sunny meadows along the Lower Platte. July. *n.* 121.—Arid, sandy Pine-woods, Tchimakaine, Spokan country. July. *n.* 503.

1. Hordeum *jubatum*, L.—Hook. Fl. Bor. Am. vol. ii. p. 256.

HAB. Saline meadows, Lower Platte. July. With *n.* 121.

2. Hordeum *pratense*, Huds. H. secalinum, *Schreb.*—Hook. Fl. Bor. Am. vol. ii. p. 256.

HAB. Stony, exsiccated watercourses, Spokan Plains. July. *n.* 554.

1. Calanthera *dactyloides*, Kth.—Nutt. Sesleria, *Nutt. Gen. v.* 1. p. 65.

HAB. Fertile plains of the Lower Platte. The "Buffalo-grass" of the trappers, as it occurs only within the range of the Bison. Anthers bright orange. June. *n.* 18.

1. Beckmannia *erucæformis*, Host.—Nutt. Gen. t. 1. p. 48.

HAB. Stony saline swamps of Upper Missouri and Oregon. June. *n.* 240.

1. Lepturus *paniculatus*, Nutt. Gen. 1. p. 81.—Kunth, Agrostr. p. 463.

HAB. Sparingly in saline, exsiccated, loamy places. July. *n*. 152.

1. Melica *bulbosa*, Geyer, MSS.

HAB. Rocky ravine, Upper Platte, and only seen in one grassy spot. June. *n*. 11.

DR. MEISNER *on* CHAMÆLAUCIEÆ.

At a meeting of the Linnæan Society, held on the 20th ult., the Secretary read a paper, by Dr. Meisner, of Basle, on the new *Chamælaucieæ* contained in the last collection of Drummond's Swan River Plants—that formed during an excursion of eighteen months to the northward of the settlement. The paper includes descriptions of twenty-two new species, viz. :—*Genetyllis*, 4 ; *Verticordia*, 7 ; *Chamælaucium*, 2 ; *Pileanthus*, 1 ; and *Calycothrix*, 8. In describing the new species of *Verticordia*, the author calls attention to some details of structure, which appear to have been hitherto overlooked or misunderstood, and which, in his opinion, render necessary certain changes in the character and subdivision of that genus, for which he proposes four sections, characterized by differences in the number and distribution of the calycine segments, viz. :—1. *Euverticordia* (including the section *Chrysoma* of Schauer) ; 2. *Verticordella ;* 3. *Catocalypta ;* and 4. *Pennuligera.*

The following is a list of the species described by Dr. Meisner, with Mr. Drummond's corresponding numbers :—

1. Genetyllis (Involucratæ) speciosa, *Meisn.* = Drummond, coll. VI., No. 34 !

2. G. (Involucratæ) helichrysoides, *Meisn.* = Drum., coll. VI., No. 35 !

3. G. (Bracteatæ) sanguinea, *Meisn.* = Drum., coll. VI., No. 36 !

4. G. (Bracteatæ) virescens, *Meisn.* = Drum., coll. VI., No. 37 !

5. Verticordia stelluligera, *Meisn.* = Drum., coll. VI., No. 50 !

6. Verticordia nobilis, *Meisn.* = Drum., coll. VI., No. 47 !

7. Verticordia (Catocalypta) callitricha, *Meisn.* = Drum., coll. VI., No. 48 !

8. Verticordia (Catocalypta) ovalifolia, *Meisn.* = Drum., coll. VI., No. 45 !

9. Verticordia (Pennuligera) chrysostachys, *Meisn.* = Drum., coll. VI., No. 46 !

10. Verticordia (Pennuligera) oculata, *Meisn.* = Drum., coll. VI., No. 43!

11. Verticordia (Pennuligera) grandis, *Drum.*, in Hook. Journ., 1853, p. 119 = Drum., coll. VI., No. 44!

12. Chamælaucium Drummondii, *Meisn.* = Drum., coll. VI., No. 41!

13. Chamælaucium affine, *Meisn.* = Drum., coll. VI., No. 40!

14. Pileanthus filifolius, *Meisn.* = Drum., coll. VI., No. 42!

15. Calycothrix tenuifolia, *Meisn.* = Drum., coll. VI., No. 57!

16. Calycothrix rosea, *Meisn.* = Drum., coll. VI., No. 56!

17. Calycothrix lasiantha, *Meisn.* = Drum., coll. VI., No. 53!

18. Calycothrix brevifolia, *Meisn.* = Drum., coll. VI., No. 58!

19. Calycothrix Drummondii, *Meisn.* = Drum., coll. VI., No. 52!

20. Calycothrix tenella, *Meisn.* = Drum., coll. VI., No. 55!

21. Calycothrix tetragonophylla, *Meisn.* = Drum., coll. VI., No. 54!

22. Calycothrix puberula, *Meisn.* = Drum., coll. VI., No. 51!

Uses of Scirpus lacustris (Bullrush) *in South America.*

We are familiar with many of the uses of the common Bullrush in our own country, for thatching, for making panniers, beehives, horse-collars, chair-bottoms, etc. etc. It serves for more numerous and more important purposes in Peru and Bolivia. In the very interesting Introduction to the 'Additions à la Flore d'Amérique du Sud, par M. Weddell' (Paris, 1850), the author says, p. 56, speaking of the vicinity of the famous Lake Titicaca, "Plusieurs cours d'eau affluents du lac coupent aussi ce district: je les passai dans des singulières embarcations composées de deux grosses bottes ou cylindres de joncs liés ensemble, et relevés en pointe aux extrémités. Ce jonc est une espèce de *Scirpus*, très-voisine de notre *S. lacustris,** et se trouve abondamment dans presque tous les bas-fonds du lac; c'était la plus grande plante que je voyais depuis mon départ de la Paz." And again, in his second visit to that region, 'Voyage dans le Nord de la Bolivie' (Paris, 1853), in describing the passage "du singulier canal qui porte le nom de Desaguadero, et qui fait communiquer le grand lac de Titicaca avec celui

* No doubt the *S. Tatora*, Nees et Mey. in Linnæa, ix. p. 292. But there is good reason to believe it identical with *S. lacustris*, which we have from Peru; and indeed from Iceland in the north, and New Zealand and Van Diemen's Land in the south, and from Peru and other parts of South America.

d'Aullagas,"—he writes, "Le point où nous le traversâmes s'appelle Balsas de Nasahara, à cause du pont de bateaux (*balsas*) qui en rallie les rives. Ces *balsas* sont construits avec une espèce de jonc (*Totora*) très-abondant dans quelques marais et dans les lagunes de la Cordillère, et ressemblant, à s'y méprendre, à notre *Scirpus lacustris.* Un plancher très-épais, également en *Totora*, repose sur les balsas, et le tout est maintenu aux rives par des câbles de la même matière."

Lieutenant Gibbon, in his 'Exploration of the Valley of the Amazon' (Washington, U.S., 1854), speaking of the Lake Titicaca, describes their boats:—"The Indians navigate the lake in *balsas*, or boats, made of the lake-rush, which forms the material for both hull and sails: they can only sail with a fair wind."—"The surface of the lake in front of Puna is nearly covered with dead rush-stalks: the stench arising is disagreeable." It seems to grow everywhere along the shores. "Here and there this lake is shoal to the nearest island, about a mile off. The rush grows thick on these shoals, which gives them a meadow-like appearance." But the summary of the history of this plant is given at p. 102:—"All the dead rushes, driven by the east winds to the west side, lodge on the flats and beach, manure the dry places, and deposit their seed; more rushes grow there to catch the sediment as the water filters through. Year after year the growth dies off, breaks down, and helps the upward levelling law. The rush grows from six to eight feet long, and is called *Totora* by the Indians. The stalk is in size and shape like the blade of a bayonet" (the author is a Lieutenant, and no botanist), "with a head and flower resembling clusters of ripe buckwheat. It supplies the place of wood, iron, canvas, and greens. The Indians were taught by the Incas to make bridges of it, over which they passed their armies: their boats and sails, houses and beds are sometimes made of it. An old Indian was seen refreshing himself with the juice at one end of the stalk, while his little child tickled another one's nose with the flower. Such are the value and uses of this wild vegetable production."

Lieutenant Gibbon, who has evidently a great dislike to these elevated regions, and a taste for the good things of the lower, and thinks the former should be left to the wild Indians, concludes his observations with the following quaint remarks:—"We cannot understand why the population of those mountains have not cleared more lands at the *base* of the Andes, where their children would find beautiful flowers,

and the men their real sugar-stalk; where they might tickle their noses with the fragrance from rich pine-apples and oranges, and where their tables might be loaded with the choicest vegetable productions."

BOTANICAL INFORMATION.

Extracts of recent Letters from Dr. Harvey, *dated* Sydney, May and June, 1855.

"I arrived here on the 1st instant, and have been botanizing in the neighbourhood. It is wretched ground for *Algæ;* and a trip to Newcastle (Hunter's River), from which I have just returned, has little result, except that I collected *Martensia elegans* in plenty.

"I have now engaged a passage in a missionary vessel, for a cruise among the Tonga and the Feejee Islands. We are to visit every island of these groups, I am told, staying a few days at each, and to be absent about four months, when we return to Sydney: this ought to be about October next. About that time Sir William Denison will be making a coasting tour to all the colonial ports north of Sydney, and has offered to take me with him, should I have then returned from the Feejees. I am anxious to see those islands, for the sake of visiting the coral banks, and finding more *Vanvoorstias.* I remain with the vessel, which is a most comfortable one, fitted up like a yacht, where I have a cabin to myself, and there is a large saloon. She belongs to the Wesleyan missionaries, to whom Henry Christy gave me a letter of introduction from their secretary in London. I had first asked a passage in the 'Herald,' but she will be absent nine or ten months on her next cruise, a great part of which will be deep-sea soundings, to prove the non-existence of reefs laid down in the charts; so Captain Denham discouraged my going.

"I have still nearly a fortnight before the vessel starts, which I shall occupy in short excursions round Sydney. As yet very few flowering plants are in blossom, but there are some. Luminous fungi were very common when I arrived (in heavy rains), but have disappeared. I collected a single specimen of *Aseroe,* and have dried it tolerably."

"June 13, 1855.

"I have just time to send you a few lines, to keep you *au courant* of

my progress. I expect to sail tomorrow morning, on board the 'John Wesley,' missionary brig, on a cruise to some of the Pacific islands. We shall first of all call at Auckland, New Zealand, where we remain a week or ten days; then proceed to Tongataboo, and visit each of the Friendly Islands in turn; then we proceed to the Feejee group, and shall visit several of those islands, as there are thirteen mission stations in that cluster; we then (probably) visit the Navigators, and perhaps the outlying island of Rotuma, and so return to Tongataboo, from which we return to Sydney, the whole route occupying about four, or perhaps, five months from this time; you may therefore address your next letter to Sydney, care of Mr. Moore, Botanic Gardens. On my arrival from the Islands I shall write to you, touching my success or failure, and to tell you of my future plans, which will depend on circumstances.

"I arrived in Sydney on the first of May, and have only visited Newcastle as yet, besides short trips in the vicinity of Port Jackson. The coast is not prolific, I believe. I wrote you of my Newcastle trip a few days ago. Since my return, while dredging in the Paramatta River, I found a single specimen of a new species of *Claudea!* quite distinct from *C. elegans*, from which it differs in the form of the leaf, and specially in the pattern of the network; the ribs and nerves diverge in a radiant manner, instead of being parallel and at right angles, and the smaller bars of the network cross in a decussate manner. I went the following day and dredged for six hours over the same ground, but found no more; I shall have another trial on my return: it would be too provoking to leave Sydney finally without securing more specimens of this singular plant. The pattern of the net is more like that of *Vanvoorstia* than of the old *Claudea*, but it has all the essential characters of the latter genus."—*W. H. H.*

Vegetable Fibres.—Botanical Garden, Peradenia, Ceylon.

"The Committee bear willing testimony to the desire evinced by the present Superintendent of the Botanical Garden, Mr. Thwaites, to render his researches practically useful to the Colony, particularly in connection with the inquiries which have recently been made for fibrous substances. The specimens however that have been produced, though

interesting in themselves, are too small in bulk to render it possible that their value as articles of trade can be accurately determined. The Committee therefore think, that a portion of the time and talents of the Superintendent of the Botanical Garden might be employed with advantage to the Colony in organizing arrangements for the preparation, on account of Government, of a ton or two of each of those fibres that may be procured from plants commonly met with either in the jungles or upon lands belonging to the natives of the country, in order that such specimens may be forwarded to London, to be reported upon and sold, and their value be thus satisfactorily ascertained.

"As soon as this information has been procured, the Committee suggest that a popular account should be published, in the English and native languages, of the plants producing the fibre, the most economical and the best mode of preparing them, the cost, or the number of days' labour required to produce a hundredweight of each description, together with any other similar details and particulars that would be important or useful.

"The Committee recommend this course, because, in order to render any discovery largely beneficial to the colony, it is indispensable that it be suited to the habits of the mass of the people, and of a nature likely to be adopted by them; and although very little success has yet attended the efforts that have been made to tempt the people of the country to new fields of enterprise, the Committee think there has been just enough to show that it is not actually impossible to accomplish this desirable object. As an instance of success, they mention the readiness with which the natives have brought in for sale great quantities of coir, prepared so as to be used instead of bristles in the manufacture of certain kinds of brushes; and it is well known that the demand for coir, prepared precisely in this manner, dates only from the commencement of the war in which Great Britain is now engaged with Russia. Another reason why discoveries, to be useful, should be applicable to the mass of the population, exists in the fact that in villages, remote from the principal towns, the value of labour must be extremely small; this is evidenced by the price at which some articles, which are manufactured in such localities, are brought forward for sale in the markets of the different leading towns."

Note on ASPLENIUM FONTANUM, *by* Mr. THOS. MOORE.

I add a remark to your account of *Asplenium fontanum* as a British plant (p. 340). The Tooting habitat, for which you quote the 'Phytologist' for 1852, is thus mentioned in my 'Handbook' (ed. 1848):—"Found in 1845, growing in company with *Asplenium Trichomanes* on an old wall near the mansion of the late D. Haigh, Esq., Tooting Common, Surrey, where it had certainly not been lately introduced." It was found by the gardener there, Mr. Gibbs, a most intelligent and respectable man of advanced years, who had for a long while, something like half a lifetime, held the situation. He had not been previously a Fern-grower, and was certain that the plant had not been artificially introduced within a period of almost half a century. This carries us back to a date when Ferns were so little grown, or cared for as cultivated plants, that I am at a loss to conceive how the *Asplenium* was to have reached such a position either accidentally or by design. At the Hampshire habitat the plants, I am told, form large patches, the size of which, as this species is not a rapidly extending plant, would give them an age to which the above consideration would apply with scarcely less force. I may also incidentally mention, as it affects another of our disputed species, that the same consideration applies to the Leyton habitat of *Cystopteris alpina*, which plant is sometimes excluded from our Flora as unceremoniously as the *Asplenium*. Mr. W. Pamplin tells me he well remembers that when quite a boy, which must carry the observation back nearly or quite to the beginning of the present century, he was in company with his father, who drove up to the roadside wall on which "the rare Fern" grew, and at that time the appearance of the plant, now fresh in his memory, was as if parsley had been sown along the wall. This *Cystopteris* does not spread rapidly, and such an appearance, even if exaggerated by childish inexperience, could only have resulted from its having been very long established there. This would carry back the date so nearly a century, that one naturally inquires who then cared for, or cultivated, or could have artificially introduced such a Fern. Nowadays, when there is such a *furor* for Ferns, a European species might become naturalized through the proximity of cultivated specimens, but it was hardly likely to happen in the middle of the last century. Recurring to the *Asplenium*, the following memoranda are quoted from my 'Handbook' (first edition,

1848):—"Mr. T. Cox informs me that he has recently, without success, examined Amersham church, in Bucks. There are specimens in the Herbarium of the Botanical Society of London, marked from Cavehill, Belfast, on the authority of Mr. W. O. Newnham; and others from rocks in Wharncliffe Wood, Yorkshire, said to have been collected in 1838, by Mr. R. M. Redhead. Mr. Hutcheson, gardener at Boxley Abbey, informs me he gathered it in 1842 on rocks near Stonehaven, in Kincardineshire. Many localities where it may exist have certainly never been examined by a scrutinizing eye." The exact habitat near Stonehaven, Mr. Hutcheson has subsequently informed me, has been destroyed by the formation of the railway.

Dr. Asa Gray *on the Development of the Seed-coats of Magnoliaceæ.**

"I have now completed the investigation of the seeds of *Magnolia umbrella*, and have got a good set of sketches made by Sprague, whose sharp eyes fully confirm all I stated. I can now further say, that the *crustaceous* covering of the seed is represented in the ovule only by the innermost layer of cells of the external coat or *primine;* that when the seed is about half-grown, the cells of this innermost layer begin to increase by merismatic division, and elongate horizontally, so producing the crustaceous coat. Now (July 31) when the seeds of *M. umbrella* have attained their full size, this coat is already hard; its very small cells are thickened and indurated by a very irregular and reticulated deposition on the walls, which, at the first appearance of these cells, were very thin, and destitute of markings."

Agave Americana *in Devonshire.*

The first American Aloe (*Agave Americana*) that ever grew and blossomed in the open air, in Britain, was in the garden of the late James Yates, at Salcombe, Devonshire, about the year 1814. We thought it a privilege to see the plant after it had done flowering, with the withered scape, attesting the fact, still attached to it. That plant was stated to have been only twelve years old. Its locality was upon the lawn in

* See vol. vii. p. 243, of this Journal.

front of Mr. Yates's villa, and, as far as we can remember, with only the road intervening between it and the sea-beach.

Since that period Salcombe has increased in population, in houses and villas, and no doubt in Agaves: for our valued friend John Luscombe, Esq., of Combe Royal, in the same neighbourhood, himself a great lover of plants, has sent us photographed portraits of no less than four different Agaves at this time (November, 1855) in full flower, in three different localities, at Salcombe. All are photographed by Mr. R. P. Yeo.

One is on the property of Mrs. Prideaux, Cliff House; and is represented within a wall on a small promontory, apparently jutting into the sea. It is twenty-six years old, and had attained a height of twenty-six feet. (Photographed November 1, 1855.)

A *second* and *third* are represented upon the side of a rough hill, full of wild plants, and seemingly not in any garden or enclosure: these are respectively twenty-six years old and twenty-five feet high; and thirty years old, twenty-eight feet high. Other flowerless Agaves growing close by, and the broad sea visible over the edge of the hill, give the scene the appearance of a coast of the Mediterranean about Nice. These are on the property of Mr. Strong. (Photographed November 2, 1855.)

The *fourth* is in the grounds at "the Molt," the property of Lord Courtenay: the height not given;—but judging from the size of the tasteful residence adjacent, and the neighbouring trees, altogether forming a most charming subtropical landscape, it must be the tallest of the four. (Photographed October 27, 1855.)

Our greenhouse Agaves, as is well known, flower so rarely as to have given rise to the saying—and which everybody believes—that the American Aloe is a plant which blossoms only once in a hundred years: here again we suspect horticulture is at fault.

Flora Indiæ Batavæ.

We are glad to see announced a 'Flora Indiæ Batavæ, oder Flora von Niederländisch-Indien, von F. A. W. Miquel,' vol. iii., royal 8vo, with 50 plates and a map. Subscription price, 24 dollars.

NOTICES OF BOOKS.

MOORE, THOMAS, F.L.S.: *The* FERNS *of Great Britain and Ireland. Edited by* JOHN LINDLEY, Ph.D., F.R.S., etc. Imp. folio. Parts VIII. and IX. Nature-printed by Henry Bradbury. London. 1855.

Our frequent notice of the progress of this work is a proof of the esteem in which we hold it. The interest of the subjects here under discussion (for few departments of Botany are more in general favour than the Ferns), the peculiar art by which the plates are represented, and the devoted zeal with which Mr. Moore performs his share of the publication, cannot fail to place it in the first of the kind of the present day; and we should be sorry, if we have in any way misinterpreted a passage in the descriptive pages of the last fasciculus (VII.), not to take an early opportunity of correcting it, and this we shall do in Mr. Moore's own words. It is in reference to our observations at p. 350 of the last (seventh) volume of our Journal: "In your last notice of the Nature-printed Ferns, you have somewhat misapprehended a statement I have made in describing *Lastrea spinulosa*. By a reference to the passage preceding that which you have quoted (p. 351), it will be seen that it was *L. cristata*, *uliginosa*, and *spinulosa*, to which I referred as so closely merging into each other by means of transition-forms of frond, that I had come to the conclusion that 'all three' were mere variations from one specific type. You appear to have understood that *L. cristata*, *spinulosa*, and *dilatata* were meant, and very naturally express surprise that, while holding this view, I should separate the two former from the latter. This however was not my conclusion. I look upon *L. dilatata*—itself a very variable and extensive group of forms—as distinct from the former three, although, as you well know, the subject is not free from difficulty, nor perhaps from doubt. The chief of these doubts and difficulties however appear to me to arise from the fact that the specimens of these Ferns in herbaria from foreign countries are generally detached fronds, or too often mere mutilated fragments of fronds; and I have little doubt that, if in the case of these foreign examples one could see the entire plants, there would be no great difficulty in referring them to one or the other of the two groups I have indicated, as there is no great difficulty in referring those British examples of which complete specimens are examined. I may

take the opportunity to mention that the fronds of *uliginosa*, figured on Plate XX., to which you specially allude (p. 320), were from one root, the production of such fronds being the characteristic of this variety. They are themselves the evidence which led me to the conviction that there is a close affinity between *L. cristata* and *L. spinulosa*. In including this latter name as that of a variety under *L. cristata* (Plate XIX.), I expressed my own view of the subject, as originally stated in my ' Handbook of British Ferns,' whilst it was printed somewhat more prominently at Plate XXI., in deference to the more general opinion. The main differences of the two groups I have above alluded to are pointed out in the text which accompanies Plate XIX."

On the above explanation, we will take leave to say that, with the inestimable advantages Mr. Moore possesses in 'Nature's Printing,' we think he would do best to be totally uninfluenced by the views and opinions of others; and that, by confining his main attention to the beautiful types of the species so faithfully represented on the plates, and discarding the hosts of synonyms (many of which cannot possibly, *with certainty*, be determined)—we especially allude to the *dilatata* and *spinulosa* group—and the overwhelming enumeration of varieties, he will come to a more accurate determination on these *quæstiones vexatæ*. We learn, for example, from Mr. Moore that the two left-hand figures (Tab. XX., *Lastrea cristata uliginosa*) are derived from the same root as the right-hand figure. This being the case, whatever may have been said in favour of the two former being considered to belong to *L. cristata*, it is quite certain that they are one and the same with the right-hand figure; and further, the outline does not partake of that of the true *cristata* (it is not narrowed at the base); and if we look at the "*L. spinulosa*" figured at Tab. XXI., we think there can hardly be a doubt of the propriety of referring it to that species, and that *L. spinulosa* is exactly intermediate between the two Ferns figured at Tab. XX., which two are from one and the same root. Surely if two forms are so different that one has been generally referred to *L. cristata* and the other to *L. spinulosa*, it should teach us a lesson not to raise less marked variations to the rank of species.

If, now, the *L. cristata uliginosa* may be safely referred to the *spinulosa* as represented at Tab. XXI., we think he must be a bold man who will separate Mr. Moore's *L. dilatata Chanteriæ*, Tab. XXIV., specifically, from *L. spinulosa*. If this be granted,—and entirely agree-

ing with him in the identity of the other marked varieties of *dilatata* figured; viz. Tab. XXII., the Hampstead Heath plant which we presume is the typical form in Mr. Moore's view, "normalis," *L. dilatata glandulosa*, Tab. XXIII., and *L. dilatata dumetorum*, Tab. XXV., together with *L. dilatata collina* and *L. dilatata nana*, Tab. XXVI.,—we cannot but regret to see nine and a half imperial folio pages devoted to the discussion of this single species, and these six varieties, now alluded to, multiplied into nine lesser varieties bearing names (exclusive of the typical form "*normalis*"). The history concludes with the remark, "Besides the varieties already mentioned, which we consider the most distinct and important, there are many other—indeed almost endless—modifications of this Fern, many of which, however, we believe to be permanent forms, although they have not all been proved by cultivation;" and with "a summary of the various forms which have come under our observation"—eighteen in number.

With such materials before him, and such means of laying, as it were, the *specimens themselves* before his readers, Mr. Moore has a right to exercise his own sound judgment, irrespective of the opinions of others, in assigning the limits of species. Then, we should say, the more concise the characters and descriptions, the better for the very numerous class who take delight in the study of Ferns, but who are puzzled at the very threshold by the wild speculations of species-makers.

We next come, Tab. XXVII., to another Fern, on which our own views are at variance with those who raise it to the rank of a species, viz. *L. fœnisecii* (Nephrodium, *Lowe*). Whatever the differences may be, however, and they are well known to British botanists (the plant is said to be hitherto found nowhere but in the British Islands and those of Madeira, Azores, and Cape de Verd), *Nature's printing* assuredly fails to represent them. There is no visible difference between the figures of *L. fœnisecii*, Tab. XXVII., and *L. dilatata* (*normalis*), Tab. XXII., or *L. dilatata collina*, Tab. XXV. It is true the diagnoses given are such as cannot be represented by this curious art. "The fragrance is a remarkable characteristic." "The scales of the stipes are fewer, narrower than in *L. dilatata*, and fringed or lacerate at the margin, pale brown and concolorous." "The fronds are more decidedly evergreen, and *commence to decay from the point, not from the base of the stipes*." Can there be such a difference? "The indusium

is not bordered with stalked glands." "The concave, crispy surface of the fronds will suffice to distinguish the plant, without recourse to the more minute characters residing in the scales and indusia."

Tab. XXVIII. is *Lastrea Oreopteris*, a species which speaks for itself, and whose specific identity has never been called in question. But it is one of those works of Nature which mocks at our generic distinctions. The indusium, small at any time, is frequently wholly wanting, or at any rate invisible, and thus has as good a claim to be ranked with *Polypodium* as with *Lastrea*, and M. Fée still ranks it in his group *Gymnosoria*.

HOOKER, DR. JOSEPH DALTON: *The* BOTANY *of the* ANTARCTIC VOYAGE.—III. FLORA *of* TASMANIA. Part I. 4to. Twenty Plates. London: Lovell Reeve.

Of the 'Botany of the Antarctic Voyage' two great and important portions are completed, viz.:—

1. The *Flora Antarctica*, comprising the botany of *Lord Auckland's Group* and *Campbell's Island*, the vegetation of which is so peculiar as to merit a separate consideration; and *Fuegia*, *South Patagonia*, the *Falkland Islands*, *Palmer's Land*, and the adjoining groups, as the *South Shetlands*, *South Georgia*, and, proceeding eastward, *Tristan d'Acunha* and *Kerguelen's Land*. Their flora is included in two large quarto volumes, illustrated by 198 coloured plates, many of them representing two or more species.

2. The *Flora Novæ-Zelandiæ*, embracing the several islands of that group; also in two volumes large folio, with 130 coloured plates.

The indefatigable author has now commenced the third and last portion of this undertaking, the *Flora of Tasmania*. The general plan, the descriptive portion and the plates (drawn and lithographed by Mr. Fitch) correspond with what has already appeared, and the same pains are taken in every part of the execution. The present number (arranged according to De Candolle's 'Prodromus') extends to the commencement of *Leguminosæ*. Very valuable observations are introduced on the geographical distribution of the species, and much more will be said on that subject when the Author publishes the "Introductory Essay to the Classification of Australian plants," which will be appended to this work. The important collections of Dr. Mueller in the Aus-

tralian Alps (as they are usually called), the highest ground in South Australia, and which have been so liberally communicated to us, are eminently illustrative of the vegetation of Tasmania. Twenty plates, beautifully coloured, accompany this fasciculus. The second fasciculus is in a considerable state of forwardness.

REICHENBACH, HEINRICH GUSTAV, *fil.*: XENIA ORCHIDACEA. Beiträge zur Kenntniss der Orchideen. 4to. 4 Fasciculi, with 40 plates, plain or partially coloured. 96 pp. Leipzig, 1854–5.

This is a truly scientific work, and a valuable contribution to our knowledge of Orchidaceous plants, which, together with the Ferns, seem, just now, to be the most attractive of all plants to the horticultural world. Here however the subjects are not, as in so many treatises on this family, selected for their beauty, but for the sake of illustrating the genera and species. Many, perhaps most of them, are necessarily taken from dried specimens, and the drawings and analyses are executed by Reichenbach, fil., himself. These are of great value to all botanists, and we cannot but thank Dr. Reichenbach, fil., for representing whatever of rarity or novelty comes in his way, irrespective of size or brilliancy of colour. Genera, and species too, are not wanting among them. We may especially mention *Epistephium Frederici-Augusti*, Reich. fil., Tab. A; *Masdevallia elephanticeps*, Reich. fil., Tab. B; *Vanda cærulea*, Griff., Tab. 5; *Pescatorea triumphans*, Reich. fil., Tab. 11; *Vanda suavis*, Lindl., Tab. 12; *Cattleya Wageneri*, Reich. fil., Tab. 13; *Uropodium Lindenii*, Lindl., Tab. 15; *Miltonia anceps*, Lindl., Tab. 21; *Odontoglossum Schillerianum*, Reich. fil., Tab. 22; *Warszewiczella velata*, Reich. fil., Tab. 23; *Solonipodium Hartwegii*, Reich. fil., Tab. 27; *Cattleya Warszewiczii*, Reich. fil., Tab. 31; *Brassia Gireoudiana*, Reich. fil., Tab. 32; *Oncidium Kramerianum*, Reich. fil., Tab. 33 (too near *O. Papilio*). These are all eminently worthy of a place in any Orchideous house, and some are all already in cultivation. The generic and specific characters and descriptions are in Latin, the observations in German. We trust nothing will hinder the continuance of this valuable work. We were sorry to find a hiatus of eleven months between the third fasciculus (Nov., 1854), and the fourth fasciculus (Sept., 1855), and no more has at present reached our hands.

Definitions of Rare or hitherto Undescribed AUSTRALIAN PLANTS, *chiefly collected within the boundaries of the Colony of* Victoria; *by* Dr. FERDINAND MUELLER, Government Botanist for the Colony of Victoria.

(*Continued from p.* 11.)

IX. SAPINDACEÆ.

29. Dodonæa *procumbens*, F. Muell.; branches prostrate; twigs hardly angulated; leaves somewhat scabrous, flat, cuneate, grossly three-toothed at the top; pedicels from the summit of the twigs solitary, or rarely two or three together, shorter than the leaves, as well as the calyx hirtellous; flowers diœcious, pentamerous, with a long style; capsule with three broad, rounded wings.

HAB. In subsaline flats and peaty places at the foot of Mount Sturgeon and Mount Abrupt.

30. Dodonæa *deflexa*, F. Muell.; upright, somewhat scabrous, viscose; twigs angulated, patent; leaves coriaceous, nearly round or ovate, repand and undulate at the margins, and sometimes remotely toothed, truncate or rounded at the top; flowers diœcious, axillary, solitary or geminate; pedicels deflexed, shorter than the leaves; sepals ovate, nearly round; capsule truncate, with four or five wings, which are expanded upwards.

HAB. In the desert scrub along the Murray River and Spencer's Gulf.

31. Dodonæa *bursariæfolia*, F. Muell.; smooth, not viscous; twigs indistinctly angulated; leaves coriaceous, nearly opaque, flat, obovate-cuneate, blunt, rarely apiculate or emarginate, always entire; flowers diœcious, axillary and terminal, solitary or two and three together; sepals oblong-linear; anthers whitish; capsule three or four-sided, with extremely narrow wings; seeds shining black.

HAB. In the barren scrub-country on the Murray River and St. Vincent's Gulf.

This species agrees in many points with *D. trigona* and *D. aptera*.

32. Dodonæa *hexandra*, F. Muell.; erect, glandular-scabrous; branchlets thin, indistinctly angulate; leaves sessile, filiform-linear, acutish, not furrowed, on the margins revolute; flowers diœcious, hexandrous, axillary and terminal, all solitary on short pedicels, nearly drooping;

sepals three, ovate-lanceolate, acuminate; filaments very short, connective puberulous at the top; capsules depressed, with three, rarely four, valves, which are wingless, but bear an appendage on the back; seed shining.

Hab. In the scrub near Port Lincoln, on limestone, *C. Wilhelmi.*

Undoubtedly similar to *D. pinifolia.*

X. Ampelideæ.

33. Cissus *Australasica*, F. Muell.; leaves palmate, quinquefoliate; leaflets coriaceous, stalked, smooth, ovate-lanceolate, acuminate, remotely serrate or entire towards the top, glaucous below; the paniculate cymes or the tendrils shorter than the opposite leaf, or equally long; flowers four-parted.

Hab. On the wooded banks of the Broadribb River.

This Australian species, which forms a high climber, is nearly related to *C. diversifolia*, DC. (not of Walpers).

XI. Zygophylleæ.

34. Tribulus *acanthococcus*, F. Muell.; prostrate; leaves longer than the pedicels, with generally five or six pair of leaflets, which are oblique, ovate-lanceolate, approximate, and in size almost equal to each other, subsessile, beneath adpressed, hairy; flowers decandrous; petals obovate, exceeding in length the narrow, oblong sepals; anthers ovate; rays of the stigma reflexed, half as long as the thick style; fruit depressed, consisting of five puberulous three-seeded carpels, which are bispinose in the middle, and on the back crested and hairy, at the commissure lacunose, and destitute of a wing.

Hab. On the sandy, loamy, arid plains along the Murray and Murrumbidgee, towards their junction.

Only one Australian species has been previously described from this genus, *T. Hystrix*, R. Br. in Sturt's Exp. into Central Australia, ii. app. p. 69 (*T. lanatus*, Walp. Annal. ii. 243), for the discovery of which we are indebted to the enterprising Captain Sturt.

XII. Diosmeæ.

New genus: Asterolasia, F. Muell.—*Flowers* hermaphrodite, solitary, sessile. *Sepals* five, petaloid. *Petals* five, membranous, minute, or wanting. *Stamens* ten, hardly exceeding the length of the

calyx. *Filaments* alternately shorter. *Anthers* erect, inappendiculate, fixed at the base, bilocular, cells bursting longitudinally. *Style* simple. *Stigma* deeply five-cleft, with filiform or clavate lobes. *Germens* five, concrete, with gemmulæ affixed to the central angle. *Carpels* five, tomentose, one-seeded. *Seeds* strophiolate.

Australian shrubs, resembling species of *Phebalium*, covered with stellate hairs, in allusion to which the generic name has been formed.

This splendid genus is exactly intermediate between *Chorilæna* and *Geleznowia*. It differs from the former in its inflorescence, smooth filaments, basifixed anthers, and smallness or absence of petals. Through the last character it approaches to *Geleznowia*, but the stigma of the latter is undivided, orbicular; and this character is supported by its very different habit.

Three species have been hitherto discovered.

35. Asterolasia *phebalioides*, F. Muell.; branched; leaves sessile, oblong or obcordate-cuneate, retuse, on both sides tomentose, with flat margins; sepals golden-yellow, exceeding twice or three times the length of the carpidia; petals wanting; lobes of the stigma filiform, only a little shorter than the hairy style; seeds opaque.

Hab. On the stony declivities of the Grampians, the Serra and Victoria Ranges, particularly frequent on Mount Sturgeon and Mount Abrupt.

36. Asterolasia *trymalioides*, F. Muell.; much branched; leaves coriaceous, ovate, on short petioles, above glabrescent, beneath tomentose, with revolute margins; sepals of equal length with the carpidia, twice or three times longer than the petals; lobes of the stigma clavate, much shorter than the smooth style; seeds shining.

Hab. On the rocky summits of the Cobboras Mountains, in the Australian Alps, at an elevation of more than 6000 feet.

37. Asterolasia *chorilænoides*, F. Muell.; much branched; leaves very spreading, sessile, coriaceous, with revolute margins, terete-linear, smooth above and velutinous beneath; flowers small, capitate, furnished with bracteoles; sepals glabrous, of equal length with the carpels; petals wanting; filaments villous below the middle; style glabrous; stigma minute, undivided; seeds opaque, tuberculate.

Hab. On dry coast-ridges near Lake Hamilton, in South Australia, *C. Wilhelmi*.

Anomalous in producing bracts and a simple stigma, yet not to be

separated from the two other species; offering thus a close approach of this genus to *Chorilæna.*

38. Crowea *exalata*, F. Muell.; much branched; upright or diffuse; twigs indistinctly angulate, wingless, puberulous; leaves alternate or fasciculate, broad, linear, gradually narrowing towards the base, blunt, minutely apiculate, with recurved margins; pedicels nearly equal in length to the calyx, solitary; petals rose-red.

Hab. On the rocky tops of Mount Macfarlane, about 5000 feet above the level of the sea; on the gravelly banks of the Mitta Mitta and Livingstone Rivers, towards Lake Omeo, and on the Boggy Creek in Gipps' Land.

Easily distinguished from *Crowea saligna* by its thicker and much smaller leaves, which are not gradually narrowed at the top, and also by its wingless twigs and smaller flowers.

39. Phebalium *ovalifolium*, F. Muell.; leaves coriaceous, ovate, smooth and shining above, lepidote beneath, their margins recurved; peduncles axillary, solitary, with a single flower and three or four bracts, compressed, twice or three times shorter than the leaves; teeth of the calyx triangular-lanceolate, glabrous; petals ovate-lanceolate, whitish, a little longer than the stamens; anthers affixed by their back; filaments glabrous; stigma capitate, five-lobed; carpels apiculate.

Hab. In the rocky or scrubby parts of the Australian Alps, at the sources of the Murray and Snowy Rivers.

That the genera *Eriostemon* and *Phebalium* are not strictly defined by clear and natural characters, has been observed previously in other instances. This handsome species, again, may be referred to either of the two genera, which I would propose to unite.

40. Eriostemon *trachyphyllus*, F. Muell.; tall, smooth, covered with glandular warts; leaves herbaceous, flat, entire, oblong-lanceolate, and much attenuated towards the base, terminated at the apex by a small point, sessile, green on both sides, and shining above; pedicels axillary, solitary, shorter than the leaves; segments of the calyx subdeltoid, glabrous; filaments fringed; style smooth; stigma five-cleft; carpels blunt; seeds shining, black.

Hab. On the mountains at the Snowy River, near the Pinch Range, on rocks.

A fine plant, closely allied to *E. myoporoides* and *E. intermedius.*

41. Eriostemon *microphyllus*, F. Muell.; dwarf; branches asperous; branchlets thinly covered with stellate hairs; leaves coriaceous, crowded, much spreading, ovate or cordate-orbicular, scabrous, with recurved apex, on short petioles; flowers several together, terminal, glandulose; segments of the calyx triangular-ovate, nearly smooth; filaments as long as the corolla, glabrous, gradually tapering towards the apex; appendages of the anthers exceedingly small; style glabrous.

Hab. On the low coast ranges of Spencer's and St. Vincent's Gulf, but rare.

Of unquestionable alliance with *E. rotundifolius* (All. Cunn. in Enum. Pl. Hüg. p. 15).

42. Eriostemon *Hillebrandii*, F. Muell.; diffuse or upright; leaves oblong, ovate or heart-shaped, truncate or shortly bifid at the top, with recurved, serrate, or entire margins, smooth on both sides, or somewhat scabrous on the surface; corymbs terminal; sepals minute, deltoideo-ovate; filaments nearly as long as the petals, smooth as well as the style; anthers inappendiculate; carpels obliquely ovate, rostellate; seeds even, and somewhat shining.—*Phebalium bilobum*, Lindl. in Mitchell's Third Exped. ii. 178.

Var. α, *brevifolius;* diffuse; leaves ovate or cordate, 2–4‴ long, imperfectly toothed, or with their margins entire.

Hab. On the rocky banks of rivulets in the Victoria Ranges.

Var. β, *longifolius;* strictly upright; leaves oblong, serrate, upwards of an inch long.

Hab. On the rocky summit of Mount William, at an elevation of 5000 feet.

This highly ornamental plant forms a connecting link between *Phebalium* and *Eriostemon*. It might almost be considered as a genus distinct from both, and South Australian specimens have been under these considerations distributed with the name of *Hillebrandia Australasica.*

43. Chorilæna *angustifolia*,* F. Muell.; leaves as well as the branches covered with stellate hair, approximate, oblong-linear, blunt, on short petioles, with revolute margins, at length glabrescent, scabrous; corymbs capitate, terminal; bracteoles linear-filiform; sepals broad-linear, half as long as the corolla, externally somewhat hairy, connate at the base; filaments smooth, surpassing in length the narrow-lanceolate petals;

* Is *Phebalium phylicoides*, Sieb.—Ed.

style smooth; stigma punctiform; germina five, distinct, narrow, puberulous.

Hab. Interior of New South Wales.

44. Boronia *algida*, F. Muell.; fruticose, much branched; branchlets spreading or divaricate, velutinous, somewhat compressed; leaves on very short petioles, with two pairs of leaflets and a terminal one; leaflets small, coriaceous, glabrous, obcordate or cuneate-ovate, with entire, hardly recurved margins; flowers solitary, twin, or rarely several together, without a common peduncle; pedicels on the base bracteolate, of nearly equal length with the ovate-lanceolate, acuminate, glabrous sepals; petals much longer than the glabrous filaments; style smooth, very short; stigma depressed-capitate.

Hab. On the highest stony declivities of the Australian Alps, Mount Hotham, Mount Latrobe, and Mount Kosciusko.

A charming bush, allied to *B. rubiginosa.*

45. Boronia *clavellifolia*, F. Muell.; fruticose, diffuse, much branched, smooth; branches tuberculate; leaflets small, ternate, short-stalked, subclavate, terete, blunt; flowers axillary and terminal, solitary, geminate or ternate, octandrous; pedicels shorter than the flower; sepals ovate-triangular, ciliate, less than half as long as the corolla; filaments smooth, glandulose.

Hab. On sandy, loamy plains in the scrub near Lake Albert, and towards the mouth of the Murray River.

46. Boronia *cærulescens*, F. Muell.; suffruticose; stems upright, branched, terete; leaves thick, sessile, oblong-linear, obtuse, channelled, beneath glandulose-tuberculate; pedicels axillary and terminal, solitary, thickened at the apex, nearly equal in length to the leaves; flowers octandrous; sepals oblong or lanceolate, scarcely half as long as the bluish petals; filaments ciliate; seeds reticulate-venose.

Var. *a*, *glabrescens;* branches, leaves, and pedicels somewhat smooth, or slightly scabrous; flowers small, sepals acute.

Hab. In barren places, from the Mallee Scrub, on the Murray River, to Spencer's Gulf.

Var. *β*, *pubescens;* branches, leaves, and pedicels short-pubescent; flowers larger, sepals oblong, obtuse.

Hab. On the rocky hills on the Grampians, and in the desert towards Guichen Bay.

47. Boronia *veronicea*, F. Muell. (Zieria veronicea, *F. Muell. coll.*);

covered with a velvet-like indument; leaves approximate, simple, ovate or subcordate, blunt, sessile, with revolute margins; flowers tetrandrous, axillary, solitary, on short pedicels, forming at the end of the branches a foliate raceme; sepals acute, lanceolate, half as long as the corolla; filaments hispidulous; carpels elliptico-oblong, compressed, pubescent.

HAB. In sandy places about Encounter Bay and in Kangaroo Island.

By this interesting species the genus *Zieria* becomes united with *Boronia*, to which I am also inclined to refer *Cyanothamnus*.

XIII. CELASTRINEÆ.

48. Celastrus *Australis*, Harv. and Muell.; climbing; branches warted; leaves glabrous, lanceolate-acuminate, crenate or repand-serrated, their teeth mucronulate; panicles terminal; capsules three-valved, cells one- or two-seeded.

HAB. On the Snowy and Buchan Rivers, not only on rich ground, but also on rocks.

The first Australian species described of this genus, resembling *C. paniculatus* and *C. dependens*, from East India.

XIV. RHAMNEÆ.

49. Trymalium *phlebophyllum*, F. Muell.; branches thickly clothed with velvet hairs; leaves coriaceous, oval or roundish-ovate, blunt or retuse, perfectly glabrous above, and densely net-veined, grey-silky beneath, their margins generally reflexed; stipules lanceolate, acuminate; glomerules disposed in cymes, tomentose; carpels indehiscent.

HAB. On the rocky summits of the Elders' Ranges, and other mountains near Lake Torrens.

Easily recognized by the numerous prominent, anastomosing veins of the leaves. Length of the leaves, quarter to half an inch.

50. Trymalium *bilobatum*, F. Muell.; branchlets subvelutinous; leaves herbaceous, wedge-shaped, with a dilated, bilobed summit, the margins flat or revolute, glabrous above, thin velvety beneath, their lobes truncate, denticulate, the notch apiculate; stipules lanceolate-subulate; umbels somewhat velvety, crowded at the summit of the branches; style three-cleft; carpels bursting at the base.

HAB. On dry scrubby ridges towards Guichen Bay, and on Spencer's Gulf.

A remarkable plant; in the form of the leaves not dissimilar to *T. bifidum;* in the arrangement of the flowers and fruit, however, resembling *Pomaderris elliptica.*

51. Trymalium *bifidum,* F. Muell.; branchlets velutino-tomentose; leaves nearly herbaceous, linear, cuneate, forked, with revolute, entire margins, above glabrous or scantily tomentose, beneath densely silky-tomentose, the notch not apiculate; stipules almost lanceolate; flowers in dense glomerules, together with the floral leaves pale grey, tomentose; petals entire; style short, undivided.

Hab. In the Marble Ranges, and on the coast of Spencer's Gulf, at Boston Point, *C. Wilhelmi.*

It may possibly be a variety of the following species.

52. Trymalium *halmaturinum,* F. Muell; branches tomentose; leaves herbaceous, wedge-shaped or ovate-truncate, retuse or bilobed, with flat or recurved margins, above thinly clothed with a partially starry tomentum, beneath densely tomentose, floral leaves nearly round or ovate, entire or bilobed, the upper surface as well as the flowers covered with a pale grey tomentum; stipules ovate-lanceolate; flowers in dense glomerules; petals entire; style simple.

Hab. On sandy ridges of Kangaroo Island and Encounter Bay.

53. Trymalium *spathulatum,* F. Muell.; branchlets silky; leaves nearly coriaceous, obovate-spathulate, gradually tapering towards the base, almost sessile, with slightly reflexed margin, rounded or truncate at the summit, terminated by a short, reflexed point; those of the branches perfectly glabrous and even above, yellowish-grey silky beneath; the floral leaves grey-velutinous above; stipules linear-lanceolate or subulate, glomerules disposed in a dense panicle, when fruit-bearing clammy; petals entire; style short, undivided; carpels indehiscent.

Hab. On the stony ranges near Mount Lofty, in South Australia, and in Kangaroo Island.

Trymalium obovatum (Hook. Bot. Mag. p. 277) differs from this in having distinctly petiolate leaves, which are clothed with a velvet indument beneath, and in its larger flowers.

54. Trymalium *subochreatum,* F. Muell.; branchlets velutinous; leaves nearly coriaceous, oblong-linear, almost blunt, with revolute margins, above scabrous or scantily velutinous, beneath densely velvety; stipules lanceolate-ovate, large; flowers cymose, glomerate, with

roundish bracts; calyces grey-velvety outside, tomentose at the base; petals entire; style simple, short; stigma trilobed.

HAB. In the desert scrub on the Murray River.

Allied to *T. angustifolium* (Reissek in Pl. Preiss. ii. p. 284).

XV. LEGUMINOSÆ.

55. Oxylobium *procumbens*,* F. Muell. [*Podolobium procumbens*, Ferd. Mueller, first gen. rep. p. 12]; fruticulose, procumbent; leaves opposite or rarely ternate, lanceolate or round-ovate, flat, entire, prickly pointed, soon glabrous; stipules setaceous, reflexed; umbels terminal, pedunculate, few-flowered, sometimes compound; bracteoles, affixed to the base of the calyx, long persistent; calyces scantily clothed with short grey hair; germens silky; pods stalked, many-seeded.

HAB. On wooded hills; for instance, at Mount Disappointment, in the Goulburn Ranges, on the Delatite, in the Black Forest, at Ballarat, etc.

This plant and several allied species tend to show that the distinctions drawn between the genera *Chorizema*, *Podolobium*, and *Oxylobium* are merely artificial.

56. Oxylobium *alpestre*, F. Muell.; fruticose, diffuse or erect; leaves ternate or opposite, oblong-lanceolate, entire, sharp-pointed, soon glabrous, on the margin recurved; stipules linear-setaceous, reflexed; umbels terminal, pedunculate, few-flowered, sometimes compound; bracteoles affixed to the base of the calyx, deciduous; calyx short grey-hairy; germens densely silky; pods villose, short-stalked, few-seeded.

HAB. Not unfrequent in the higher parts of the Australian Alps.

57. Burtonia *subalpina*,† F. Muell.; twigs almost silky, soon glabrescent; leaves crowded, undivided, filiform, channelled, awnless, smooth, scabrous; stipules longer than the petiole; flowers sessile, terminal, capitate; calyx and germen villose-silky; corolla purple; style below hardly broader.

HAB. On the rocky summit of Mount William, at an elevation of about 5000 feet.

Not dissimilar to *B. diosmæfolia*, from which it differs as well as from all other Western Australian species of the genus, in producing stipules. The pod is yet unknown.

58. Phyllota *pleurandroides*, F. Muell.; twigs pubescent; leaves re-

* *Oxylobium spinescens*, DC.

† This is probably a species of *Pultenæa*.—ED.

curved, spreading, linear, sharp-pointed, scabrous, with refract margin, the floral ones crowded, and below the middle villose; flowers concealed between the leaves, either axillary, solitary, or collected in terminal few-flowered heads; bracteoles ovate, keeled, shorter than the tube of the silky calyx; standard surpassing considerably the length of the keel, but little that of the wings; style below the middle appressed-hairy, unbearded on the apex; pod somewhat hairy, ovate, slightly compressed; seeds destitute of a strophiole.

HAB. In arid plains, at the foot of Mount Abrupt, in Kangaroo Island, and Encounter Bay.

59. Eutaxia *sparsifolia*, F. Muell.; branchlets spreading, silky, as well as the calyces; leaves dispersed, short-stalked, semiterete, trigonous, channelled, glabrous, acutish, slightly recurved, spreading, at length deflexed; flowers a few together on the top of the branchlets, stalked, without bracteoles; upper lip of the calyx rounded, a little emarginate, teeth of the lower lip deltoid acuminate; pods turgid.

HAB. In the desert scrub towards the mouth of the Murray River. Found also at Tumbay Bay by C. Wilhelmi.

60. Pultenæa *Benthami*, F. Muell.; robust, erect; twigs angular, somewhat silky; stipules lanceolate-subulate, concrete at the base; leaves nearly flat, coriaceous, lanceolate or oblong, awnless or ending in a sharp point, either smooth and even on both sides, or below silky; petiole very short; heads terminal, few-flowered, surrounded at the base by imbricate brown, ovate, or roundish ciliolate bracteas; bracteoles navicular-lanceolate, with exception of the margin, smooth, brown, scarious, affixed to the tube of the whitish-silky calyx; upper lip of the calyx short-bilobed, considerably shorter than the lanceolate subulate laciniæ of the lower lip; germen, together with the basis of the style, silky.

HAB. On springs and rivulets in the Grampians, and amongst rocks on the top of Mount Abrupt.—This elegant species, which stands nearest to *P. myrtoides*, A. Cunn., has been named in honour of Mr. George Bentham, the eminent monographer of this Order of plants.

61. Pultenæa *fuscata*, F. Muell.; branchlets hardly spreading; leaves stalked, trigonous, linear, channelled by the inflexed margin, acute, mucronulate, the uppermost below the middle long ciliated, the rest smooth; stipules large, concrete, imbricate, setaceous, acuminate, fringed; heads few-flowered; teeth of the calyx and bracteoles setaceous, acuminate, downy; ovary sessile, silky.

HAB. Between the Coorong and Murray River, on scrubby localities. Next to *P. aristata*.

62. Pultenæa *canaliculata*, F. Muell.; branchlets hardly spreading, velvety; leaves oblong-linear, blunt, very short-stalked, channelled, gradually tapering into the base, somewhat silky; stipules lanceolate or linear-subulate, downy; heads few-flowered; calyces downy, pale, membranous, little longer than the downy, linear, setaceous bracteoles; teeth of the upper lip broader, all setaceous-acuminate; ovary sessile, velvety; pod beaked; seeds somewhat shining.

HAB. Encounter Bay.

Near to *P. mollis*, Lindl.

63. Pultenæa *densifolia*, F. Muell.; branchlets divaricate; leaves small, crowded, coriaceous, broadly-obovate or somewhat cuneate, stalked, glabrous, mucronulate, rarely blunt, recurved, shining above, veined beneath, margins flat, sometimes with a few hairs; stipules imbricate, nearly lanceolate, membranous, pale brown, fringed; flowers axillary, solitary, or in terminal heads; calyces membranous, little longer than the fringed, lanceolate, mucronulate bracteoles, with the exception of the margin, smooth, their teeth nearly equal, setaceous-acuminate; pods oblique-ovate, turgid, slightly silky, sessile.

HAB. In the lower Murray Desert, and near Port Lincoln, according to C. Wilhelmi.

It stands in relation to *P. parviflora*.

64. Bossiæa *egena*, F. Muell. (*Daviesia egena*, F. Muell. in Trans. of Phil. Soc. of Victoria); tall, much-branched, leafless; branches terete, erect, furrowed, unarmed; racemes very long, terminal; pedicels solitary or twin, shorter than the calyx, furnished at the top with two bracteoles, which are rounded, persistent, ciliolate, connate at the base, and larger than the lower ones; calyx indistinctly angulate, with acute teeth, the lower ones the longest; keel perfectly blunt, hardly longer than the wings; stamens monadelphous; ovary nearly sessile; style smooth; pods oblique, oblong-ovate, slightly convex, with a very short beak; seeds equally brown, with a papillous, irregular-lobed strophiole.

HAB. In the barren bushy plains along Spencer's Gulf, Lake Torrens, the Flinders Ranges, and Murray River.

65. Bossiæa *distichoclada*,* F. Muell.; erect, unarmed; branches and twigs in two rows, terete, grey-velutinous, densely foliate; leaves small,

* This is *Bossiæa foliosa* of Allan Cunningham, collected by himself near Bathurst. —ED.

on very short petioles, bifarious, assurgent, coriaceous, nearly kidney-shaped, at the top awnless and divided into two very short lobes, their margins recurved, above scabrous, on both sides, with the exception of middle rib, glabrous; stipules ovate- or lanceolate-subulate, long persistent, at length reflexed, often of the length of the leaves; pedicels short, axillary, solitary, with rounded or ovate ciliate bracteoles; upper lip of the somewhat silky calyx bifid, lower lip three-parted; pod much compressed, roundish-rhomboid, covered with rusty down, containing from one to three brown black-spotted seeds.

HAB. In the Australian Alps, from the Mitta Mitta to the tributaries of the Snowy River, as well between rocks as along the peaty margins of the rivulets.

This singular and beautiful plant never descends to regions lower than 4000 feet; and being, at 5000, for many months during the year covered with snow, it will, like the new previously-mentioned *Burtonia*, and many other of our alpine plants, form an exquisite addition to the garden Flora of colder countries.

66. Psoralea *parva*, F. Muell.; sparingly pilose; stems herbaceous, procumbent, almost simple; leaves trifoliolate, on long petioles; leaflets narrow-lanceolate or of the radical leaves elliptical, perfectly entire, dotted, ending in a sharp point, the intermediate one larger; stipules streaked, ovate-lanceolate, with a subulate apex; peduncles long; spike at first capitate, but generally at length interruptedly extended; bracteoles roundish-cordate; calyces somewhat silky, nearly sessile; pods slightly hairy.

HAB. In dry pastures on the Thompson and Latrobe Rivers, and in South Australia, on the Torrens and Gawler Rivers, on the Barossa Ranges, near Villunga, etc.

It differs from *P. tenax* in its always trifoliolate smaller and less acute leaves, in sessile, less deeply divided calyces, in the form of the longer persistent bracteoles, in the whitish or pink corolla, and in the pod, which is neither black nor smooth.

67. Psoralea *adscendens*, F. Muell.; smooth or sparingly pilose; stems herbaceous, diffuse adscending, at the base procumbent; leaves trifoliolate, on long petioles; leaflets lanceolate, acuminate, entire, sharp pointed, dotted, the intermediate one larger; stipules lanceolate-subulate; peduncles long, upwards as well as the calyces somewhat hairy; racemes dense, almost spicate, many-flowered, of the length of

the leaflets; bracteoles lanceolate-ovate, acuminate; pods black, wrinkled-scabrous.

HAB. On the grassy moist banks of the Snowy River, Gibbo River, Mitta Mitta, Ovens River, and along the torrents of the Australian Alps.

This fine plant approaches nearer to *P. Australasica* than to *P. tenax;* the colour of the flowers is purple, like that of the former, not deep blue as in the latter, from which it differs besides in the greater size of all parts and the above notes. It may be considered a subalpine plant, whilst *P. tenax* hardly advances anywhere into the mountains.

68. Leptocyamus *sericeus*, F. Muell.; all over grey-silky; stems procumbent; leaflets lanceolate-linear, acuminate, above at length a little glabrescent; pedicels axillary, subsolitary; pods silky; seeds shining-black, even.

HAB. On sand-ridges along the Murray River, towards the junction of the Murrumbidgee.

To the same genus belongs *Zichya Latrobeana* of Meisner (in Lehmann Plant. Preiss. i. p. 94).

69. Cassia *revoluta*, F. Muell.; shrubby; leaves with a channelled rachis, and with six to ten pairs of leaflets, which are linear-lanceolate, pointed, smooth above, hairy beneath as well as along the revolute margins, a subulate gland between each pair; stipules linear-subulate; bracteoles cymbiform-ovate; peduncles axillary, about as long as the leaves, with from two to four umbellate flowers, together with the branches; pedicels and rachis pubescent; sepals ovate, glabrous, ciliate, the outer ones broader; one petal much shorter than the rest, nearly round; legume stalked, smooth, slightly arched.

HAB. On gravelly, sometimes overflown, places along the Avon in Gipps' Land.

The systematic position of this *Cassia* will be between *C. Australis* and *C. Schultesii.*

70. Acacia *tenuifolia*,* F. Muell.; procumbent or rarely erect, twigs soon terete, hispidulous; leaves scattered, opposite or sometimes fasciculate, spreading, often retroflexed, linear-subulate, rigid, pungent, nearly tetragonal from the prominent nerve, hardly tapering into the base, glandless, scabrous; stipules setaceous, persistent; peduncles solitary or twin, smooth, about as long as the leaves; heads globose, many-flowered; sepals ciliolate, nearly three times shorter than the

* Is *A. Brownii*, Benth.

four-parted corolla; pods glabrous, linear falcate, hardly between the seeds contracted; seeds shining, supported by a conduplicate thick brownish strophiole.

HAB. In dry, stony ranges near Ballarat, towards the Goulburn and Broken River. It stands in relation to *A. Brownii*, and varies like many other species with downy leaves.

71. Acacia *Wilhelmiana*,* F. Muell.; viscidulous; stems angular, puberulous; phyllodia incurved, upright, short linear-filiform, compressed, ending in a broader, blunt recurved apex, above or on both sides furrowed and furnished with two thin veins; stipules ovate, acuminate, very glutinous, deciduous or at length spinescent; peduncles axillary, solitary, shorter than the flower-heads; pods viscid, narrow, arcuate, slightly contracted between the seeds.

HAB. In the Mallee Scrub on the Murray, where it was first discovered by Mr. Wilhelmi.

Allied to *Acacia Hookeri*.†

(To be continued.)

Note on the Voyage of the NORTH AUSTRALIAN EXPLORING EXPEDITION, *from* Sydney *to the Mouth of the* Victoria River; *extracted from a Letter of* DR. MUELLER (Botanist to the Expedition), *dated*

On board the 'Monarch,' Sept. 3, 1855.

In a very few days we expect to reach our destination at the Victoria River, and as our attention then will be fully required to disembark our horses, sheep, and stores, and to protect them against the natives, I avail myself of a spare evening to address these lines to you, which will reach you *viâ* Singapore.

We advanced as far as Clarence Strait prosperously, except that we grounded on a shoal, partially composed of coral reefs, near Port Byron, and we had a particularly agreeable voyage through the inner passage along the Barrier reefs, so that the horses, on which the success of the expedition depends to such a great extent, suffered less from their long prison, than could have been anticipated. The necessity of anchoring for

* Is a variety of *A. nematophylla*, F. Muell. (Benth. in Linnæa).

† Is *A. ericæfolia*, Benth.

several nights at the more dangerous places on the way to Torres' Strait, as well as an afternoon's stay at Albany Island, gave me an opportunity of examining for the first time some of the tropical plants of Australia; and moreover our stay at Moreton Bay, where we received the horses and sheep for the expedition, enabled me to form also some botanical collections in the rich neighbourhood of that place.

With Mr. Gregory's consent I have packed up all duplicates and all seeds gathered at these localities, which will be sent to the Colonial Office, London, through the Honourable T. Church, Resident Councillor, Singapore. These collections are accompanied by the botanical description of such species as I considered as yet undescribed or wrongly classified, and also by lists of almost all the plants seen, but not always collected, at the respective localities. The specimens, all in one box, amount to nearly a thousand. Since I am however now of course destitute of any means of comparison, and as I am even, for want of room, very insufficiently provided with books, I must crave your indulgence with regard to some of the names of the plants adopted in the manuscripts; indeed I deem it, under these circumstances, requisite that an English botanist should compare the plants which I send with your Herbarium previous to their publication. The manuscripts dwell upon the following plants, viz.:—*Dennisonia nobilis*, *Nephelium tomentosum*, *Nephelium edentulum*, *Geigera multiflora*, *Cocculus Hookerianus*, *Polanisia insularis*, *Abutilon acutatum*, *Sida dictyocarpa*, *Euphorbia oraria*, *Phyllanthus gracillimus*, *Psoralina prostrata*, *Brachycome microcarpa*, *Lagenophora pachyrrhiza*, *Soliva acaulis*, *Monenteles gnaphalioides*, *Helichrysum oxylepis*, *Kippistia riparia*, *Glycycocca tiliæfolia*, *Mitrasacme scabra*, and *Cassyta cuscutæformis*.

Above all I am very anxious to see the Sapindaceous genus *Dennisonia* confirmed, as it may be a species only of some of Blume's additional genera of that order not inserted in Endlicher's genera. If you deemed the publication of these manuscripts necessary or desirable, it might also give a favourable opportunity of bringing some other *allied* new species under notice from my unpublished former manuscripts; for instance, *Cocculus Harveyanus*, etc.

It may not be quite uninteresting to sketch the vegetation on which I had lately a passing glance; for although, with few exceptions, the plants alluded to in the index were no doubt long ago collected by the late Allan Cunningham, still only a limited number of them has

been brought by him into notice; and even when I enumerated plants common at Port Jackson, it must be deserving of remark, which of them advance to sub-tropical or even tropical latitudes. But this sketch could hardly be extended beyond the bare enumeration, and if I am at all entitled to venture any remarks upon such limited material, they must not be viewed as conclusive; for even at Moreton Bay the briefness of our stay rendered it impossible to extend my botanical excursions beyond a few miles from the Brisbane River, and it is but justice to state, that through Mr. Hill's local knowledge, I was enabled to add many a plant to the collection, which otherwise, in such a flying visit, might have escaped my notice.

On the mainland, although not falling exactly within the tropics, the tropical forms outnumber far the rest, and in the shady ravines, full of humidity, the characteristic vegetation of the more southern latitudes of Australia almost entirely disappears. One of the most striking facts appeared to me to be the scantiness of the *Compositæ*, which form here, as in the tropical isles afterwards visited, an exceedingly small proportion of the vegetation. The genera *Soliva* and *Spilanthes* appear new to Australia; *Sapindaceæ* and *Euphorbiaceæ* increase, as might be expected; but *Epacrideæ* I saw represented only by a species of *Leucopogon* and *Acrotriche*, and *Proteaceæ* by *Grevillea robusta* and a *Banksia*.

Orchideæ include many terrestrial ones from the South, whilst under the influence of the genial climate also the parasitical species occur, and form a prominent feature in the vegetation. Along with them the single forms of *Platycerium grande*, the numerous *Lianas*, *Caladium*, etc., impart a luxuriance and grandeur to the scenery unusual in Australia. Mosses and Lichens are vastly on the decrease, and were almost wanting in the isles towards Torres' Strait, which promises but a very poor harvest of them on the north coast.

The dry sandy ridges and the swamps of Moreton Island produce, on the contrary, a vegetation almost alike to that of Port Jackson, as may be observed in the enumeration which I prepared; still *Pandanus*, *Spermacoce*, *Bruguiera*, *Mucuna*, *Canavalia*, *Vigna*, *Dioscorea*, etc., remind of the tropics. *Epacrideæ* are particularly numerous, *Tremandreæ* wanting.

The vegetation of the islands which we visited on our way to Torres' Strait (isles off Cape Bedford, Howick's Group, Cairncross Island, Al-

bany Island) exhibits mostly plants identical with species from India or the South Sea Islands. A *Tribulus* appears to be identical with the desert species from the Murray and Darling. *Sesuvium*, *Polycarpæa*, and *Polanisia*, I find unnoticed amongst Australian genera; and *Glycycocca*, intermediate between *Wallrothia* and *Vitex*, is altogether new, and not unworthy of notice, on account of its pleasant fruit; unfortunately only one specimen was found of it.

Mimusops Kauki is another fruit-plant from these localities, and occurs abundantly; in perfect maturity the fruit loses its astringency, and is then by no means to be despised. *Araucaria* was discernible on many of the islands which we passed; but, like *Callitris*, observed on none of those on which we landed. On Albany Island a single Proteaceous plant was observed, namely, *Grevillea gibbosa*, forming a tall bush or a very small tree, resembling, in its dull grey foliage, certain *Eucalypti*. *Wahlenbergia gracilis* was here also growing; and perhaps other herbaceous plants, common in extratropical Australia, would likewise be noticed at a more favourable season.

But of the most interesting points for plants yet unexplored in Eastern Australia, we had only a view, but this view close enough to be tantalizing. I allude to the high bold ranges which approach here and there on the tropical eastern coast to the sea, as Mount Hinchinbrook (3500 feet high), Mount Bellenden Ker, and Cape Tribulation. In one glance we could see displayed before us favourable landing-places, spurs for easy descent, richly wooded groves, with a varied tint of vegetation; and if I add to this the information gleaned from Mr. Carron's narrative on the lowland Flora, who discovered hereabouts, in the unfortunate Kennedy's expedition, a Pitcher-plant, a *Musa*, *Anacardium*, etc., it is then unnecessary to speak of my ardent desire to return once to localities so promising for the enlargement of our favourite science.

Our main labours are now soon to commence, and we shall be banished from civilized society for a long period. I trust that we shall be able to retain strength in the hot, enervating climate, so as to gain the great results expected from this Expedition,—results which will probably be conclusive to the whole geography of Australia; and we are happy that the choice fell fortunately upon Mr. Gregory as our leader, whose tried ability and pleasing, serene manners cannot fail to inspire all equally with confidence and devotion.

Should the botanical results to be gained during this journey be but proportionately small, which is very possible, considering the nature of the Expedition, and the probable absence of high ranges in Central Australia, I shall then *not* apply for leave of absence to return to England, but shall rather continue my labours in some part of Australia, provided the Colonial Government will again supply limited *subsidia* for that purpose. But if the Flora of the interior should prove so rich as to answer to my sanguine expectations, and if the means of transport will admit of my collecting all the species occurring there, and above all, if Providence grants me life and health for this work, then I shall be greatly cheered in my home journey to Europe by the anticipation of the pleasure of paying you personally my respects, and gaining so much information at your magnificent establishment.

Since I wrote this letter the gentlemen of the schooner landed, under Mr. Gregory, at Quail Island, where a few plants were obtained. They were the following:—*Pandanus spiralis*, *Spinifex fragilis*, *Eucalyptus* sp., *Ficus* sp., *Polycarpæa* sp., *Röttlera* sp., *Jasminum divaricatum*, *Cassytha* sp., *Tacca pinnatifida*, *Menispermum* sp.?, a beautiful broad-leaved *Loranthus*, a prostrate *Sida* with very short pedicels, and what I consider to be a new genus of *Chrysobalaneæ* (*Basistylis*). There appears also to be at that place, to judge from a few fragments, a new genus of *Polygoneæ*, but I am quite uncertain, having seen neither leaves nor fruit. In the box with specimens forwarded to the Right Honourable the Secretary of State for the Colonies you will find a Cucurbitaceous plant, named *Sicyos Cunninghami;* since then I had time to analyze it, and observed it to belong, together with a second species, to the genus *Zehneria.* Neither of them agrees exactly with the general character in Endlicher's genus, and I have ventured consequently to describe both as distinct from the Norfolk Island plants. The other manuscripts are already packed up, so that I extract the diagnosis, in case you would be inclined to give them publication with the rest.

Zehneria *Cunninghamii* (Sicyos sp., *Cunningh. MS.?*); ramis gracilibus, foliis indivisis deltoideo- vel sagittato-hastatis acuminatis repandis denticulatis mucronulatis, floribus monoicis utriusque sexus in axi sæpissime geminato conjuncto longe setaceo-pedunculatis, masculis triandris, fœmineis stamina sterilia producentibus, stigmatis

tripartiti lobis sursum dilatatis revolutis, baccis subglobosis, seminibus compressis nigrescentibus basi obtusis margine leviter incrassatis.

HAB. In nemoribus secus flumen Brisbane, necnon in insulis sinus Moreton Bay.

Herba *Sicyos angulati* facie nisi gracilior.

Zehneria *erythrocarpa;* foliis palmato-quinquelobis vel trilobis, laciniis oblique lanceolatis acuminatis mucronulatis margine denticulatis, medio laciniarum basi angustata, floribus monoicis axillaribus fasciculatis breviter pedunculatis, masculis triandris, fœmineis stamina sterilia producentibus, stigmatis tripartiti lobis subcordatis reflexis, baccis magnis subovatis rubris, seminibus turgidis margine crasso cinctis.

HAB. Antecedenti consociata.

Herba præeunte robustior. *Folia* pleraque 2–3 unc. longa. *Flores* masculi pæne semiunciales, fœmineis paulo majores. *Fructus* fere pollicares, interdum vitellini, sæpius lætissime rubri, longitudinaliter albo-vittati.

Anthesis utriusque speciei sub hoc cœlo perpetua.

There is amongst the plants forwarded to the Government a new genus allied to *Euphorbia*, which is furnished at the limb of the involucre, instead of scaly bracteoles, with tender white petals, or, if you like, bracteoles. I selected the name *Petalandra* for the genus.

"September 19, 1855.

Tomorrow I shall leave, in all probability, the 'Monarch,' and I close therefore this letter. Mr. Gregory will perhaps, by another way than through the hand of the Consul-General, forward the specimens; he has not yet decided upon this point. On the entrance of the Victoria River are a few plants collected; I enumerate those with which I am more or less acquainted. *Sporobolus Indicus*, *Jasminum divaricatum*, *Sesbania Australis*, *Ægialitis annulata*, *Rhizophora Mangle*, *Pandanus spiralis*, *Scævola Koenigii*, *Cycas media*, *Vitex ovata*, *Vitex triphylla* (*V. glabratæ* prox.), *Melaleuca* sp., *Eucal.* sp., *Grevillea* sp., *Hakea* sp., *Persoonia* sp., *Acacia* sp., *Monencyanthes gnaphalioides*, *Ficus* sp., *Salicornia Indica*, *Cressa Cretica*, *Careya*, *Pavetta* sp., *Asparagus fasciculatus*, *Ægiceras fragrans*, *Hemistemma dealbatum*, *Flagellaria Indica*, a species of *Dimetopia*, in which only one mericarp is developed (*D. hemicarpa*), *Eriachne* sp.; but this is the autumn, and consequently very few plants are to be observed in flower. FERD. MUELLER.

P.S. I observe that I omitted in the list *Ægialitis annulata*, which occurs on Howick's Group. *Sonchus oleraceus* and *S. asper* are, if I rightly remember, reunited in the 'Flora of New Zealand.' I beg to point out, besides the constant differences in the fruit, shape, and size of the leaves, the difference in the internal structure of the stem.

Note on the SAND-BINDING PLANTS *of the* Madras Beach; *by* H. CLEGHORN, M.D., Professor of Botany, Madras.

Having lately been requested by the Military Board to examine the condition of the South Beach, between the Saluting Battery and St. Thome, with a view to consolidate the drifting sands thrown up near Colonel Cotton's groins, I endeavoured to estimate the comparative value of the different species of maritime plants in preventing the encroachments of the sea on the land, and in fixing the loose soil along the shore. All that seems worthy of mention has been condensed in the following short notice of these useful plants.

Of the plants growing on the Madras Beach, the species known to Europeans by the designation of "Ground Rattan" (*Spinifex squarrosus*) comes nearest to the Sand *Carex* of England in its habit of growth, creeping along horizontally, sometimes above, sometimes below the surface of the earth, emitting roots and shoots at short intervals of a few inches. It likewise possesses the advantage of being extremely tenacious of life; the shoot at every node is capable of renewing the existence of the individual as fast as destroyed, and the whole plant offers a resistance to the storm which is rarely overcome. I think this species would be nearly as indestructible from natural causes as Couch-grass, and it appears to me (after watching patches of it on the road to Ennore, where it is little disturbed), that it would speedily colonize the sand tracts spontaneously if it were only left unmolested for a year or two. The fishermen do not appreciate the conservative design of this Ground Rattan or Mat-grass, but collect it for fuel, and thus destroy their greatest protection: the reason seems to be that the spiny leaves injure their naked feet, and the turf does not answer for spreading their nets upon. On this account it would be well to propagate the other species mentioned, immediately in front of fishing villages. This grass is polygamo-diœcious, and reproduction is effected in a very remarkable manner: the male spikes, congested into an um-

bel, are carried by the wind to the female flowers, which are fascicled on a distant plant, and being light and spherical, the Dutch call them "Wind-ball" (*Windboll*).

Rumphius, in the Herb. Amboinense, alludes to this plant as being connected with a superstition among the natives, who, seeing the capitula carried along the shore by the sea-breeze, think they are propelled by the devil.

Ipomœa Pes-capræ of Sweet.—Goats'-foot-leaved *Ipomœa* (also known as Rabbit-weed).—Perennial, creeping to a great extent. Stems rooting at distant intervals. Leaves smooth, long-petioled, two-lobed like those of *Bauhinia*. Flowers large, reddish-purple, very handsome.—Common on the sandy beach, north and south of Madras, where it is of great use in binding the loose sand. This fine creeper is equally abundant on both peninsulas, and is also a native of Mauritius, Macao, etc., occupying the place of *Convolvulus Soldanella* of the Scottish coast. Rabbits, goats, and horses eat it, so do cows, but their milk is tainted.

Hydrophylax maritima, Linn.—Seaside *Hydrophylax*.—A straggling, herbaceous plant, native of the shore of Coromandel, where it shows its pale pink blossoms a great part of the year. The branches run over the sand (sometimes under the surface), and strike root at the joints. —Figured in Roxb. Cor. t. 233.

Microrhyncus sarmentosus, Wight.—A widely diffused, humble plant, common all along the sea-beach, with long, flagelliform runners. It is well figured in Wight's Illustrations, vol. ii. t. 133.

Pupalia orbiculata, Wight.—Stem prostrate. Leaves orbicular.—An extensively spreading, procumbent plant, of which the runners occasionally measure 3 or 4 feet. It is abundant at St. Thome and the mouth of the Adyar River.—Figured in Wight's Icones (?).

Pandanus odoratissimus, Linn. (*Kaldera Bush*).—A large, spreading, ramous shrub, fringes the coast in many places, and is often planted in belts, but it takes up much room, forms dense thickets, and harbours venomous reptiles. This is a very strong binder, but is objectionable from its raising sand-hills, which interrupt the currents of sea-breeze to the island.

Ehretia arenaria, Griffith, which is found between 12° and 28° north latitude (*vide* Notulæ ad Plantas Asiaticas, Part IV. p. 212), appears to be widely distributed along the sea-coast, and binds together the loose sand, although in a minor degree.

The above are the sand-binding plants most frequently noticed along the Coromandel Beach. There are others, as *Pedalium Murex* and *Sesamum prostratum*, etc., which co-operate in the work of conservation to a minor extent; these are less widely diffused along the coast. In this notice I have only included those which seem obviously preferable for the purpose specified.

List of Sand-binding Plants:—*Spinifex squarrosus, Ipomœa Pes-capræ, Hydrophylax maritima, Microrhyncus sarmentosus, Pupalia orbiculata, Pandanus odoratissimus, Ehretia arenaria.*

NOTICES OF BOOKS.

Géographie Botanique Raisonnée, *ou Exposition des Faits principaux et des Lois concernant la Distribution Géographique des Plantes de l'époque actuelle; par* M. Alph. de Candolle, etc. 2 vols. 8vo. Paris.

This most important work has long been anxiously expected, no less by Botanists than by all other classes of Naturalists, for it has for some years been known that M. Alph. de Candolle was engaged upon it. It is not easy to select from a book so comprehensive, and involving the details of such a multiplicity of subjects, any one or few that could give an adequate idea, either of its extent, or of the skill and learning that have been expended upon it; nor to give even an outline of those varied attainments which eminently qualify M. de Candolle for the successful accomplishment of so great an undertaking, without detailing his career as a Naturalist, from his pupilage under his illustrious father, to the date of publication of the present work. We can only say that the result of his labour is in every way worthy of his parentage, his talents, and the many years of study he was devoted to it.

The main subject is divided by M. de Candolle into two principal divisions, together occupying two large royal octavo volumes, each containing upwards of 600 closely-printed pages. The first of these volumes opens with three chapters on temperature, light, and humidity, but is chiefly occupied with the subject of *Geographical Botany*, or the study of the species, genera, and families of plants, under a geogra-

phical point of view, a subject which extends into the second volume. This is followed by the second main division, entitled *Botanical Geography*, that is, the study of the different countries of the globe viewed with regard to their vegetation. The work is concluded with a chapter on general results, and an Appendix indicating the directions in which researches should be pursued by those desirous of advancing the study of the Geography of plants.

To give any adequate review of a work so comprehensive and elaborate as this, is obviously quite beyond both the scope and the function of the 'Journal of Botany.' We believe however that a *résumé* of the contents of the various chapters it contains will be very acceptable to our own readers, no less than to those who propose making a special study of the work itself. They are as follows:—

Book I. Preliminary observations on the *rationale* of the action of Temperature, Light, and Humidity.

Chapter 1. Plants in relation to their surrounding physical conditions.

Chapter 2. Upon some of the effects of Temperature and Light upon plants, and upon several methods of measuring the influence of these agents.—In this chapter a succession of subjects are treated as separate articles, in more or less detail. Of these the most important are,—on the temperature of the soil and of the air at certain distances from it; on the direct effect of the sun's rays; on the effects of low temperatures and of high temperatures, whether such are regarded as having no effect or as being absolutely injurious; on the effect that is immediately induced by the accession of a favourable amount of temperature; on variations of temperature; on the combined effects of temperature and the clearness of the sky; on the observations necessary for obtaining directly the sums of the temperatures above that degree which is necessary for the performance of the ordinary functions of the species.

Throughout the above-mentioned articles are scattered a multitude of tables of temperature, sunlight, and registers of the effects of these elements upon the distribution of wild and cultivated herbs, shrubs, and trees; also tables of the mean and extreme temperatures of many places on the surface of the globe, and the comparison of these with one another; on the relation of elevation to latitude and temperature; of light and shade to germinating seeds, etc.

Chapter 3 is devoted to the geographical distribution of the sums of influencing temperatures.—Under this M. de Candolle states that "The temperatures that influence each species, and that determine each of its functions, are those above a certain degree, which degree varies with every species and with each of its functions. The means of these influencing temperatures, accumulated for days or for months, year after year, differ in every locality, and are the elements of the climate of each, so far as the phenomena of their vegetation is concerned."

Book II. Geographical Botany, or the study of species, genera, and families, under a geographical point of view.

Chapter 4. On the limitation of species on plains and upon mountains.—After some preliminary observations, chiefly occupied with detailing some of the obstacles to the diffusion of plants, all of which M. de Candolle believes to be overcome by them if the climate is suited to their dispersion, he proceeds to divide his subjects into—

§ 1, Limits of native species growing at the level of the sea; as absolutely determined in their advance towards the poles or towards the equator; to the eastward, and to the westward; and afterwards their relative limits are discussed. The distribution of many annual, perennial-rooted, and perennial-stemmed, etc., plants, is here given in detail, and laws deduced from them; or at least the conditions of climate apparently necessary to their healthy existence, are accurately tabulated. Excluding a host of minor and disturbing causes, the limitation of species towards the poles is summed up as indirectly due to the diminished temperature, and more directly to the excessive cold of winter, to the sudden check given in spring by accessions of cold to the young buds or flowers, or to the absence of heat at certain times impeding particular functions. With regard to the equatorial limits of the same or other species, they are generally determined by either heat or dryness, the first of which causes is more or less directly appreciable, the second is very complicated, and involves the action of Rain, Dew, Evaporation, etc.

§ 2 is devoted to the limitation of native species in ascending above the level of the sea. This is at once the most popular and perhaps the best worked of all the branches of Botanical Geography or Geographical Botany; but yet M. de Candolle truly observes that the subject is still involved and obscure, general laws are sought in vain

amongst a multitude of valuable data, appertaining to certain mountain-chains, or to certain groups of plants. Amongst the principal causes of the difficulty of coming to any satisfactory results, is said to be the limitation of the area over which one observes; a few feet of elevation being analogous to many miles of latitude, all the causes that interfere with absolute determinations of the polar and equatorial limits of plants at the level of the sea, are proportionately increased when we attempt to discover their upper and lower limits upon a mountain; to this is added, the greater facilities for accidental transport of seedlings, beyond the normal limiting line of the species, the position and persistence of snow and of fogs, the varying nature of the soil within a small area, and perhaps the density of the atmosphere; also the want of data as to the climate of alpine regions; thus, in Switzerland (the best-known alpine region of the world), we are told that there are two points alone (Saint-Gothard and Saint-Bernard), at which the monthly mean temperatures of the air at any elevation more than 600 mètres above the level of the sea have been determined.

The causes which limit the upward and downward spread of species upon mountains, are treated of in detail, under Humidity; temperature of the air, of the water, and of the upper strata of the soil, especially as affected by solar and terrestrial radiation; exposure; rarity of the air; mineral character of the soil; geological character of the mountains; isolation of mountains or their approximation in groups; duration of Snow; and finally a section is given to the relative importance of each of these causes. Critical details of the distribution of individual species follow. In concluding the subject of the upward limitation of species, M. de Candolle dwells at length on the necessity of first studying the distribution of the same species on plains, before any attempt can be made to explain their limitation on mountains.

Of the downward limits of species on mountains little is said; data are wanting, and the difficulty of observing is greatly increased; very few cases are adduced, and the general laws are supposed to be analogous to those which determine their equatorial limit. A curious article follows, upon the very different relations to one another in respect to the elevations they inhabit, that the same species affect in different mountain-systems, even when these are in the same latitude.

From the distribution of native species M. de Candolle passes to the consideration of cultivated, and here the natural cases become compli-

cated with artificial ones of all kinds, as with the history of nations, their rise and decline, their intelligence, activity, and the abundance or scarcity of food. The subject is divided into that of their Polar and Equatorial limitation, and the species principally treated of are —Barley, Maize, the Vine, and Date. Of these the Barley appears to give the most definite results, from the extent of the area over which it is cultivated, and the exactitude of the data that have been observed regarding its limits.

The chapter on the Limitation of Species is followed by concluding remarks on the causes which limit species, whether at the level of the sea or upon mountains.

Chapter 5. Form of the area inhabited by species (" Forme des habitations des espèces").—This is an exceedingly curious subject, hardly capable of a very rigorous study; some species occupy nearly circular areas, others extend in one direction many times further than in another; the causes of these irregularities are to be found in the preceding chapter on the limitations of species. Of 8495 species described in the three last published volumes of De Candolle's 'Prodromus,' it appears that only 116 extend in one direction more than four times as far as they do in the other, whilst the greater number of species appear aggregated in areas that approach a circle or ellipse in form.

Chapter 6. Aggregation and segregation of the individuals of a species in different parts of the area it inhabits (" Répartition des individus dans l'habitation de l'espèce").—The principal object of this chapter is to sketch out the main features of the local distribution or Topography of plants, or the local causes that determine their absence, presence, or prevalence in different localities. Of these some are very evident, such as rocks, walls, hedges, brushwood, forest, prairies, sands, turf, cultivation, waysides, farmyards, parasites and epiphytes, melting snow, salt-marshes, fresh-water marshes, sea-water, fresh-water, warm springs, etc. Of the less obvious influencing causes are the mineralogical character of the soil, which seems to act chiefly through the mechanical nature of the medium into which it disintegrates; exposure; the circumstance of the soil having long been occupied by a species; and the agency of the animal creation. This is followed by an article on the very different localities affected by the same species. The comparative frequency of a species, or rather the comparative abundance in which a species may exist, is next discussed, the means

adopted for expressing the facts examined into, and some of the causes that appear to lead to isolation or aggregation are detailed.

The causes of aggregation are divided into those that depend on the constitution of the species and those that arise out of the conditions of the station or locality. As a question quite apart from this, the subject of the general diffusion or rarity of a species over a great extent of country, and over the whole area inhabited by the species, is discussed; and tables are given, derived from the Flora of France, from which it appears that there is a larger percentage of very common Dicotyledons than of Monocotyledons, of biennials than of annuals, of annuals than of perennial-rooted plants, and of the latter than of bushes and trees; and that of the principal Natural Families the species of *Chenopodiaceæ* are the most widely distributed, the *Orobancheæ* least so; that of *Labiatæ*, *Polygoneæ*, *Junceæ*, and *Amentaceæ*, upwards of 30 per cent. are very common plants, whilst of *Orchideæ*, *Liliaceæ*, and *Campanulaceæ*, less than 10 per cent. in each are very common; of *Orchideæ* only 2·7 per cent.

The effect of a series of years in changing the relative abundance of species next occupies M. de Candolle's attention; and under this head the important subject of the replacement of species is discussed, and a number of very curious facts on the alternation of species detailed.

Chapter 7. On the area occupied by species.—The difficulty of determining the amount of species occupying a considerable area is very great, and three methods of doing so are proposed: the first, suggested by Brown, is taking the species common to two countries the furthest removed from one another, as Australia and Europe, and assuming that they are common to all or most intermediate countries; the second consists in taking local Floras or Monographs, and finding the number of species limited to the area of which they treat, and of those that are found elsewhere; the third consists in dividing the surface of the globe into a certain number of regions as precisely defined as possible, and arranging the species into those found in one, two, or more of these regions.*

* M. de Candolle proceeds to divide the globe into fifty such regions, of necessarily very unequal geographical dimensions, but unfortunately of not sufficiently equal value as botanical regions either; this however is the most difficult part of the work, and we apprehend that the necessary data for the subdividing the globe into provinces characterized by approximately equivalent differences of vegetation hardly exist.—Ed. J. B.

This article is followed by another, full of valuable comparative observations on the amount of peculiar and widely dispersed species taken from many local Floras. The author next proceeds to inquire into the areas occupied by species in relation to the families to which they belong; thus, comparing South Africa with France, 44 per cent. of the African *Chenopodiaceæ* are common to France, and only 0·3 per cent. of the *Compositæ;* whilst conversely, only 24 per cent. of the French *Chenopodiaceæ*, and 0·6 per cent. of the French *Compositæ*, are found in South Africa. The next succeeding article, on the areas occupied by species in relation to the localities they affect, he finds to be capable of much greater illustration; thus the general dispersion of fresh-water plants, marine plants, etc., is universally known, and on these and many similar facts M. de Candolle adduces a multitude of observations and of curious exceptions.

In an article on the relative magnitude of the areas occupied by annual, biennial, etc., plants, and on great or small plants, M. de Candolle states that the species of small Phænogamic plants occupy larger areas than of great, and that the same remark may be extended to the whole vegetable kingdom.

The question of the means of dispersion is naturally suggested by these inquiries. Some of the results here given are extremely striking, and quite opposed to our popular notions of adaptability and final causes; thus, that the pappus and other appendages to fruits is given to aid dispersion is universally believed, but if it be so, how startling are the facts, that of six large families, each containing a large number of species whose seeds have aids to dispersion, and also a large number of species whose seeds have none, those whose seeds have *none* are more widely dispersed than the others; these families are *Ranunculaceæ*, *Rosaceæ*, *Malpighiaceæ*, *Sapindaceæ*, *Combretaceæ*, and *Compositæ*. On the other hand, plants with numerous and small seeds are more widely dispersed than others.

The observations on the area occupied by species, compared with the power in their seeds of retaining their vitality, has great interest at present, now that the question of seeds retaining their vitality after being long buried in the soil is demanding a complete re-investigation. In one experiment of M. de Candolle's, the seeds of 368 species were preserved for 15 years, when 20 of each were sown; of 10 *Malvaceæ*, 5 germinated; of 45 *Leguminosæ*, 9; of 30 *Labiateæ*, 16; whilst of

10 *Scrophularineæ*, as many *Umbelliferæ*, 16 *Caryophylleæ*, 32 *Grasses*, 34 *Cruciferæ*, and 45 *Compositæ*, none germinated. From the consideration of a vast number of facts, M. de Candolle concludes, that the families whose seeds retain vitality longest are *Malvaceæ*, *Leguminosæ*, *Cucurbitaceæ*, *Solaneæ*, and *Polygoneæ*. The presence of oil in the seed he regards as certainly obnoxious to retention of vitality in *Cruciferæ*, *Euphorbiaceæ*, and *Compositæ;* but when the seeds are buried deeply, they may yet retain their vitality. Seeds with horny albumen, as those of *Rubiaceæ*, also quickly lose their vitality.

An article is devoted to the area occupied by species in relation to the countries which they inhabit. Meyer's* researches in South African botany, and Ledebour's on Russian, afford the data for reasoning upon this subject; of these, the South African plants appear extremely limited, and the Russian to have very wide ranges. Elaborate calculations follow, to determine the relative dimensions of the areas of the species of single well-known Natural Families.

Under the head of Phænogamic plants with very extended areas, details are given of a list of 117 species, which are found over at least one-third part of the surface of the globe; these are—

Ranunculus aquatilis, *L.*
,, repens, *L.*
Caltha palustris, *L.*
Argemone Mexicana, *L.*
Capsella Bursa-pastoris, *DC.*
Erysimum cheiranthoides, *L.*
Nasturtium officinale, *Br.*
,, palustre, *DC.*
Cardamine hirsuta, *L.*
Drosera rotundifolia, *L.*
,, longifolia, *L.*
Spergula arvensis, *L.*
,, saginoides, *L.*
Stellaria media, *Vill.*
Arenaria rubra, *L.*
Cerastium vulgatum, *L.*
,, viscosum, *L.*
Oxalis corniculata, *L.*
Tribulus terrestris, *L.*

Sonchus asper, *Fuchs.*
Anagallis arvensis, *L.*
Samolus Valerandi, *L.*
Menyanthes trifoliata.
Convolvulus arvensis, *L.*
Calystegia Sepium, *Br.*
Hyoscyamus niger, *L.*
Datura Stramonium, *L.*
Solanum nigrum, *L.*
Verbascum Thapsus, *L.*
Herpestes Monniera, *Kunth.*
Veronica Anagallis, *L.*
,, scutellata, *L.*
,, serpyllifolia, *L.*
Limosella aquatica, *L.*
Verbena officinalis, *L.*
Lippia nodiflora, *Mich.*
Thymus Serpyllum, *L.*
Clinopodium vulgare, *L.*

Potamogeton lucens, *L.*
,, perfoliatus, *L.*
,, crispus, *L.*
,, pectinatus, *L.*
,, natans, *L.*
Alisma Plantago, *L.*
Sagittaria sagittifolia, *L.*
Luzula campestris, *DC.*
,, pilosa, *Willd.*
Juncus communis, *Ellis.*
,, bufonius, *L.*
Cyperus polystachyus, *Rottb.*
Elæocharis palustris, *Br.*
Scirpus lacustris, *L.*
,, maritimus, *L.*
Carex muricata, *L.*
,, cæspitosa, *L.*
,, paludosa, *Good.*
,, curta, *Good.*

* His data however require extensive modification.—Ed. J. B.

Trifolium repens, *L.*
Potentilla anserina, *L.*
Callitriche verna, *L.*
Hippuris vulgaris, *L.*
Myriophyllum verticillatum, *L.*
Portulaca oleracea, *L.*
,, var. sylvestris.
Montia fontana, *L.*
Daucus Carota, *L.*
Galium Aparine, *L.*
Ageratum conyzoides, *L.*
Erigeron Canadense, *L.*
Eclipta erecta, *L.*
Maruta Cotula, *L.*
Artemisia vulgaris, *L.*
Gnaphalium luteo-album, *L.*
,, uliginosum, *L.*
Senecio vulgaris, *L.*
Taraxacum Dens-leonis.
Sonchus oleraceus, α & β, *L.*

Prunella vulgaris, *L.*
Marrubium vulgare, *L.*
Lamium amplexicaule, *L.*
Plantago major, *L.*
,, lanceolatus, *L.*
Chenopodium murale, *L.*
,, album, *L.*
,, ambrosioides, *L.*
Amaranthus Blitum, *L.*
Polygonum aviculare, *L.*
,, Convolvulus, *L.*
,, amphibium, *L.*
Rumex Acetosella, *L.*
Urtica urens, *L.*
,, dioica, *L.*
Lemna minor, *L.*
,, trisulca, *L.*
Trypha latifolia, *L.*
,, angustifolia, *L.*
Zannichellia palustris, *L.*

Alopecurus geniculatus, *L.*
,, pratensis, *L.*
Phleum pratense, *L.*
Panicum Crus-galli, *L.*
Setaria glauca, *Beauv.*
,, viridis, *Beauv.*
,, Italica, *Kunth.*
Phragmites communis, *Trin.*
Cynodon Dactylon, *Pers.*
Poa Eragrostis, *L.*
,, annua, *L.*
,, trivialis, *L.*
,, nemoralis, *L.*
Glyceria aquatica, *Sm.*
,, fluitans, *Br.*
Catabrosa aquatica, *Beauv.*
Briza minor, *L.*
Dactylis glomerata, *L.*
Triticum repens, *L.*
Trisetum subspicatum, *Beauv.*

The conclusions drawn from the study of this list are stated to be very striking, and strongly confirmatory of the general laws laid down in the preceding articles; they are—

1. No species of Phænogamic plants extends over the whole surface of the globe; one alone, the *Sonchus oleraceus*, can perhaps exist in all climates, from pole to pole, but demands a cultivated soil or azotized humus.

2. The number of species known to occupy one-half of the globe's surface is very small, and confined to 18 species.

3. The total number occupying one-third of the surface of the globe is 117; and supposing that future researches increase it to 200, it will still form an extremely small portion of the whole Phænogamic vegetation* (about 0·001).

* That this number is capable of far greater increase than M. de Candolle supposes, we have no doubt. The progress of modern discovery is to reduce apparent species, which are founded upon characters that are peculiar only to the *individual*, or fragments of an individual, preserved in our collections. The mass of described species are in this category, so that the list in question will be increased—1, by the discovery of well-established species in countries they are not now known to inhabit; and, 2, by the union of supposed distinct species: and the numerator of the fraction expressing their proportion to the whole Phænogamic vegetation will be increased

4. The plants characteristic of different localities bear a very different proportion to one another in the list, to what they do to the whole Phænogamic vegetation.

5. The aquatic or subaquatic appear to have been dispersed widely, quite independently of the agency of man.

6. Not one tree or bush appears on the list;* the *Thymus Serpyllum* is the only approach to a woody plant.

7. The list contains 47 annuals, 3 biennials, and 66 perennial-rooted plants.

8. The great extension of continent towards the north of our hemisphere powerfully influences the distribution of many species; no less than 108 of the 117 entirely or chiefly occupy the temperate or cold latitudes of the northern hemisphere.

9. The species in the list may be supposed to have spread without difficulty from station to station on the continents; but it is worthy of remark, that every species which is widely diffused over both continents, inhabits also the intervening islands, under the same latitude. Hence it follows that the oceans were no greater obstacles to the dispersion of the plants in question, than the land was, or that the dispersion took place at a period when the islands were nearer the continents, or formed part of them; or, lastly, that the same species originated in more than one locality.

10. The species most widely diffused belong generally to families which have been already noticed in this Work, as containing species that occupy large areas: from this M. de Candolle adds a corollary, that when a family contains one or more species of unusually extended range, most of the other species of that family may be assumed to occupy considerable areas.

11. The proportion of Dicotyledons to Monocotyledons in the list is as 73 to 44; and as the whole number of known Dicotyledons to Monocotyledons is as 62 to 38, it follows that the species of Monocotyledons occupy a greater area than those of Dicotyledons.

in a double ratio, for whilst the reduction of varieties to species and the additional habitats increases the numerator, the former cause diminishes its denominator.—Ed. J. B.

* When the tropical flora is better investigated, several decidedly bushy, if not arboreous, plants, will no doubt have to be added, as perhaps *Avicennia* and other coast-species, which at present have different names in the Old and New World.—Ed. J. B.

12. The majority of the species enumerated in the list run into varieties.*

13. The seeds and fruits of the plants enumerated present no characters in common, and only 15 are distinguished by having mechanical aids to dispersion.

A section is given to species inhabiting very circumscribed areas. Of these, the majority of the best marked are insular, and the Islands of St. Helena, Tristan d'Acunha, Madeira, and Juan Fernandez, and the Gallapagos, present conspicuous examples. Of continental European species, the most remarkable are *Campanula excisa*, Schl., and *isophylla*, Moretti; *Lithospermum Gastoni*, A. DC.; *Omphalodes littoralis*, Lehm.; *Linaria Candollei*, Chav.; *L. thymifolia*, DC.; *Scrophularia Pyrenaica*, Benth.; *Wulfenia Carinthiaca*, Jacq.

A section treats of the mean area occupied by species, a subject far too loose to admit of any accurate data being established from it; it is followed by another, on the causes that determine the relative extent of the areas occupied by species. Towards the solution of this question little can be done beyond co-ordinating facts; there has been much false reasoning on it, as M. de Candolle truly says: thus, that aquatic plants occupy greater areas than terrestrial, is a fact that admits of no solution in the present state of our knowledge; it has been ascribed to the fact of the temperature of water being more equable than that of land; but this is wholly unsatisfactory, for the same water-species inhabits marshes in Italy and in Sweden, whilst different land-plants inhabit equatorial regions that have a similar temperature and climate.

The first volume terminates with observations on the causes that determine the extension or non-extension of species; on the mode of discriminating between botanical or physiological and geographical causes, and between modern or existing and anterior or suppressed causes of extension; and lastly, with an elaborate application of these principles to known facts.

(*To be continued.*)

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* Perhaps the most significant observation in this valuable Work, and one that is pregnant with results, when philosophically applied to the whole question of species.—Ed. J. B.

Definitions of Rare or hitherto Undescribed AUSTRALIAN PLANTS, *chiefly collected within the boundaries of the Colony of* Victoria; *by* Dr. FERDINAND MUELLER, Government Botanist for the Colony of Victoria.

(*Continued from p.* 46.)

XVI. HALORAGEÆ.

72. Pelonastes *tillæacea*,* F. Muell.; leaves short, somewhat blunt, as well as the sepals, entire; flowers all sessile, the male ones with four stamens; carpels minutely and scantily verrucose.

HAB. In wet localities of the Emu Flat, near St. Vincent's Gulf.

73. Haloragis *acutangula* (Sect. *Cercodia*), F. Muell.; stem perennial, erect, angular, branched; leaves scattered or sometimes opposite, lanceolate-linear, flat, beyond the middle furnished with linear-subulate remote serraturæ, on the margin denticulate-asperous, on both sides glabrous, but, like the stem, slightly asperous; floral leaves entire; flowers hermaphrodite, with eight stamens and four stigmas, generally sessile in the axils of the upper leaves, solitary or glomerate, thus forming a long foliate spike; laciniæ of the calyx cordate-deltoid, acuminate, of less than half the length of the glabrous petals; fruit large, acute-quadrangular, glabrous and smooth, with four cells, the angles keeled.

HAB. On ridges about Port Lincoln, *C. Wilhelmi.*

It agrees best in its characters with *H. racemosa* (Labill. Nov. Hol. i. p. 100, t. 128).

XVII. LYTHRACEÆ.

74. Ammannia *Australasica*,† F. Muell.; annual, glabrous; stem erect, simple or branched, square; leaves ovate- or linear-oblong, blunt, with a dilated base clasping; cymes axillary, on very short peduncles, or rarely the flowers solitary in the axils; calyces cup-shaped, with four very short acute teeth and four indistinct ones alternating with them; petals four, nearly lanceolate, flavescent, very soon falling off; stamens four; capsule globose, extremely thin, one-celled.

HAB. On boggy places, periodically under water, along the Rivers Murray, Darling, and Murrumbidgee.

* *Myriophyllum integrifolium*, Hook. fil., Flora of Tasmania.—ED.

† Apparently an Asiatic species, though not *A. multiflora*.—ED.

The first species discovered in Australia, bearing affinity to *A. multiflora* from East India, and to *A. pusilla* from South Africa; differing from both already in the colour of the petals.

XVIII. Myrtaceæ.

75. Verticordia (Sect. *Euverticordia*) *Wilhelmii*, F. Muell.; quite smooth; leaves crowded, linear-semiterete, at last triquetrous, very short mucronate; corymbs terminal, compound; bracteoles distinct, without ribs, awnless, caducous; tube of the calyx ovate-bell-shaped; lobes of the limb with from three to five capillary, naked, simple segments; petals glabrous, perfectly entire; sterile stamens extremely minute, linear-subulate, glabrous, undivided; style exserted, nearly straight, bearded at the extremity.

Hab. On limestone ridges at Boston Point, *C. Wilhelmi.*

This exceedingly pretty little bush forms one of the systematic links between the flora of South and Western Australia. It is accompanied by *Myoporum parvifolium*, *Dodonæa humilis*, *Phyllanthus cygnorum*, *Templetonia retusa*, and other Western Australian plants, but appears to be the only species of this charming and numerous genus which reaches so far east. The simple lobes of the calyx distinguish it at once from all others, except *V. Lehmanni*, *habrantha*, and *umbellata*, and these belong to a different section of the genus.

76. Kunzea *pomifera*, F. Muell.; procumbent; branchlets glabrous or with the calyces velvety; leaves crowded, spreading, coriaceous, imperforated, either cordate or ovate-roundish or lanceolate-ovate, terminated in a recurved short point, glabrous or puberulous, indistinctly five-nerved, veined, with flat scabrous margin; flowers few in a head, terminal, white; bracts roundish; bracteoles broad-ovate, all velvety on the back, shorter than the calyx-tube; filaments long, exserted; petals nearly twice as long as the deltoid segments of the calyx; fruit nearly globose, somewhat baccate, slightly downy, with three cells; ripe seeds perfectly even, shining.

Hab. On the sandy shores and on rocks at St. Vincent's Gulf and Rivoli Bay.

The fleshy fruit is edible, and called native apple by the South Australian colonists. The plant is in some degree allied to *Kunzea recurva* and *R. Schaueri.*

77. Kunzea *peduncularis*, F. Muell.; erect, glabrous or rarely

downy; leaves crowded, coriaceous, perforated by oil-glands, linear or oblong-lanceolate, acute, one-nerved; flowers white, axillary, solitary, stalked, crowded below the summit of the branches or forming terminal corymbs; bracts downy, lanceolate-linear, deciduous; petals twice as long as the deltoid segments of the calyx and half as long as the stamens; capsule with three, four, or five cells, immersed in the dry campanulate calyx; ripe seeds hardly shining, reticulate.

HAB. At the foot of the Australian Alps, on the banks of rivers and rivulets.

Leaves and flowers similar to those of *K. corifolia*, fruit smaller and nearly campanulate, its stalk sometimes of thrice the length of the calyx.

78. Camphyromyrtus *pluriflora*,* F. Muell.; leaves spreading, lanceolate-linear or oblong-lanceolate, acutish, awnless, with flat, perfectly entire margin; peduncles generally three-flowered.

HAB. On the banks of the Tambo, on the Snowy River, and on several of its tributaries.

79. Camphyromyrtus *crenulata*,† F. Muell.; leaves spreading, ovate or obovate-oblong, blunt, with flat, densely and unequally crenulated margin; peduncles one- to three-flowered.

HAB. On springs and rivulets of the Buffalo Ranges.

80. Leptospermum *brevipes*, F. Muell.; branchlets glabrous or in a young state somewhat silky; leaves flat, oblong-lanceolate, very short-pointed, glabrous, three-nerved, full of oil-dots; flowers solitary or twin, axillary or on very short branchlets, terminal; pedicels and calyces grey, silky-pubescent, the former as long or longer than the latter; lobes of the calyx pubescent, persistent, lanceolate; capsule depressed, five-celled.

HAB. Generally a companion of *Kunzea peduncularis*, to which it bears more resemblance in habit than to any of its congeners, being quite anomalous in producing very conspicuous flower-stalks. It ranks nearest to *L. divaricatum*.

81. Lhotzkya *genethylloides*, F. Muell.; flowers terminal, nearly capitate; leaves crowded, exstipulate, spreading, petiolate, without stipules, tetragonal, at length above flattening, subobtuse, as well as the

* This is *Harmogia virgata*, Schauer.—ED.

† Agrees better with the generic character of *Harmogia* than that of *Camphyromyrtus*.—ED.

twigs and the tube of the calyx hirtellous; bracteoles shorter than the pentagonal tube of the calyx, connate to the middle and apiculate by the excurring carina.

Hab. In rocky, arid declivities of the Grampians, the Serra, and Victoria ranges.

Var. *β*, *glabra;* dwarf; leaves almost smooth.

Hab. On the subalpine summit of Mount William.

I do not hesitate to refer to this species *Genethyllis alpestris* of Lindley (in Mitchell, Three Expeditions, vol. ii. p. 178), described from specimens collected by Sir Thomas Mitchell on Mount William. These specimens, transmitted to Professor Lindley, were probably not well developed, being gathered in the month of June. Examining the plant last year in the month of November, I became convinced that it belongs to the genus *Lhotzkya.* I have not retained the specific name *alpestris*, as the plant occurs most abundantly on the lower parts of those mountains, and in localities much exposed to the hot north-westerly winds.

XIX. Cucurbitaceæ.

82. Cucurbita *micrantha*, F. Muell.; stems prostrate, angulose, simple, as well as the petioles strigosely asperous; leaves subcordate, with five short, blunt, dentato-sinuate or incised lobes, on both sides hirtello-asperous, on the margin and beneath along the nerves densely strigulose; tendrils short, undivided; peduncles axillary, filiform, fasciculate, much shorter than the petiole, with the calyx pubescent; flowers monœcious; berries globose, even, smooth, many-seeded.

Hab. On the sandy-loamy banks of the Murray, sometimes washed by the floods.

The fruit might, on account of its intense bitterness, perhaps be substituted for *Colocynth.*

XX. Portulaceæ.

83. Mollugo *Novæ-Hollandiæ*, F. Muell.; stems numerous, prostrate, dichotomous; leaves pseudo-verticillate, unequal, spathulate-lanceolate, at the top indistinctly serrulate, finally glabrescent, young ones together with the branches woolly-pubescent; flowers triandrous, pseudo-verticillate; sepals blunt, a little longer than the ovate capsule and about equal in length to the pedicel; seeds reniform-ovate, shining-brown, densely seriato-granulate.

HAB. On the sandy, sometimes inundated, banks of the Murray.

This presents the first Australian species of this genus, and must be systematically placed next to *M. hirta*, from the Cape of Good Hope.

XXI. PARONYCHIEÆ.

84. Mniarum *singuliflorum*, F. Muell. (*Scleranthus mniaroides*, F. Muell. collect.); stems cæspitose, somewhat flaccid; leaves upright or little patent, as well as the branches smooth, lævigate; peduncles one-flowered, at the top bibracteate; calyx turgid, five-cleft.

HAB. On bare rocks at the summit of the Cobboras Mountains, 6000 feet above the level of the sea.

Easily to be distinguished by the above notes from *M. biflorum* (*M. fasciculatum*, R. Br., *S. Mniarum*, F. Muell.), the only known species, and like this varying in the length of the peduncles. By the constantly five-cleft calyx of this kind, *Mniarum* becomes so closely allied to *Scleranthus*, that hardly any objection can be raised against the conjunction of the two genera.

XXII. CUNONIACEÆ.

85. Bauera *sessiliflora*,* F. Muell.; hirsute; leaves lanceolate or subovate, generally entire; flowers axillary and terminal, sessile, pseudo-verticillate; calyces to the middle eight-cleft, with subulate-lanceolate or linear segments, and with a slightly ribbed obconico-cylindrical tube; petals purple; stamens about twelve; anthers oblong-ovate, emarginate, black.

HAB. On the rocky, subalpine summit of Mount William, and thence descending along the rivulets into the valleys.

Flowers larger and of a much deeper colour than in *Bauera Billardieri*.

XXIII. UMBELLIFERÆ.†

86. Hydrocotyle *pterocarpa*, F. Muell.; subglabrous; stems creeping; leaves orbicular-reniform, indistinctly five- to seven-lobed, crenulate-repand; stipules broad, membranaceous, not fringed; petioles longer than the downy, solitary peduncle; umbels generally many-

* Not different from *B. rubioides*, Andr.—ED.

† Two other *Umbelliferæ*, *Dichopetalum ranunculaceum* and *Microsciadium cuneifolium*, are described by Dr. Mueller at Vol. VII. of this Work.—ED.

flowered, nearly capitate; fruits didymo-obcordate, much compressed, broad-winged, even, with a rib on each side of the mericarps.

HAB. From Mount Disappointment to the Ovens River, on rivulets.

Allied both to *H. peduncularis* and *plebeja*. Sometimes viviparous.

87. Hydrocotyle *geraniifolia*, F. Muell.; subglabrous; stems long, diffused, lax, partially rooting; leaves three- to five-parted, the lower ones peltate; segments of all divaricate, ovate or linear-lanceolate, grossly and unequally serrate or lobed, gradually narrowed into the apex, cuneate at the base; stipules membranaceous, fringed; petioles shorter than the thread-like, sometimes divided, peduncles; umbels many-flowered; pedicels capillary, much longer than the flowers; fruits kidney-shaped, didymous, compressed; mericarps winged at the back, with a rib on each side, and a semicordate excavation at the commissura.

HAB. In moist valleys of Mount Disappointment, of the Dandenong Ranges, and thence to the western part of Gipps' Land.

Its systematic position is near *H. quinqueloba*.

88. Pozoa *fragosea*, F. Muell. (*Fragosa hydrocotylea*, F. Mueller, coll.); glabrous; rhizome thick, creeping, with numerous long fibres; stems very short, prostrate; leaves herbaceous, long-petiolate, orbicular-reniform, net-veined, divided scarcely to the middle into five to nine crenulate lobes; stipules broad, membranous, torn; umbels sessile on the base of the petiole or pedunculate, capitate, generally many-flowered; leaflets of the involucre five to eight, connate, lanceolate, with a few setaceous lobes; teeth of the calyx deltoid-ovate, somewhat acuminate, nearly acute; petals greenish; carpels ovate, compressed on the back, with five hardly prominent ribs, strongly contracted at the axis.

HAB. Under the shade of rocks on the highest tops of the Munyang Mountains, but of rare occurrence; 6000 feet.

I assigned to this plant a place in the genus *Pozoa*, on account of the great resemblance with *Pozoa reniformis*, *P. Ranunculus*, and *P. trifoliata*, but cannot suppress my opinion that *Pozoa* and *Azorella* rank only as groups of one large and polymorphous genus, namely, *Fragosa*.

89. Dimetopia (Sect. *Eriosciadium*) *eriocarpa*, F. Muell.; dwarf, downy; leaflets of the involucre as long as the rays of the fruit-bearing umbel, narrow-lanceolate or linear; mericarps equal to each other, on

either side rugulose and covered all over with a thick, white, woolly tomentum.

Hab. On barren stony ridges near Cudnaka, in the neighbourhood of Lake Torrens.

90. Seseli (Sect. *Euseseli*) *algens*, F. Muell.; glabrous, glaucous; stems several, generally decumbent, herbaceous, simple, from a perennial root; petioles with an ample vagina; radical leaves simply pinnatisected; segments trapezoid, trifid or the upper ones cuneate, all in front deeply and acutely toothed, often laciniated; leaves of the stem from one to three, pinnatisected; rays of the umbel four to five, unequal, furrowed, glabrous; bracts one to three; bracteoles several, both setaceous; fruit glabrous, truncate-ovate, with very prominent ribs.

Hab. On the gravelly borders of alpine rivulets and springs in the Munyang Mountains; 5–6000 feet.

The want of ripe fruit of this plant leaves some doubt about its true generic position. It is unquestionably allied to *Seseli Harveyanus*.

91. Seseli (Sect. *Euseseli*) *Harveyanus*, F. Muell.; glabrous; stems several, erect, herbaceous, simple, from a perennial root; petioles of the stem with an ample vagina; radical leaves pinnatisected; upper segments lanceolate- or broad-linear, undivided, gradually pointed; the lower ones to the middle or nearly to the base two- or three-cleft or again pinnatisected; leaves of the stem simply pinnatisected or undivided; umbel with four to eight unequal, angulate, glabrous rays, and with a solitary or without a bract; bracteoles one to three, linear-setaceous, unmargined, sometimes wanting; fruit glabrous, oblong, somewhat compressed, with sharp prominent ribs and solitary vittæ in the interstices.

Hab. In alpine and subalpine meadows from the Cobboras to the Munyang Mountains; 4–5000 feet.

Not dissimilar to *Seseli Pallasii* from Russia, offering a new and unexpected connecting link between the Australian plants and those of northern countries, since the genus was very scantily hitherto represented in the southern hemisphere, and quite unknown in Australia. The whole plant is of sweetish aromatic taste, reminding of Fennel and garden Chervil, and might, I think, be cultivated to advantage.

92. Gingidium *glaciale*, F. Muell.; diœcious; stem robust; leaves rigid, in outline almost ovate, bi- or tripinnated; segments hardly spreading, broad-linear, undivided, acute, mucronate, streaked, as well

the rachis channelled and transversely articulated; umbels many-rayed; carpels equal, semiterete.

HAB. In the higher regions of the Australian Alps; not rare; 5–7000 feet.

The strange rigid foliage attracts the notice of all travellers who have penetrated into these mountains.

93. Gingidium *simplicifolium*, F. Muell.; diœcious; leaves rigid, undivided, elongate-linear, articulated, perfectly blunt, somewhat channelled; lower umbels few-rayed, supported by an undivided, large, vaginated leaf.

HAB. In moist, grassy, subalpine meadows, from Mount Wellington to the Munyang Mountains.

It is certainly very singular that the species of *Anisotome* or *Gingidium* should be all endemic. Their striking feature is highly developed by gigantic species in Campbell's and Auckland's Islands, reappears by numerous distinct forms in New Zealand, but is wanting in Tasmania.

XXIV. ARALIACEÆ.

94. Panax *angustifolius*, F. Muell.; fruticose, unarmed, glabrous; leaves simply or bipinnate; leaflets spreading, carnulent, in three to seven pairs, oblong-linear, perfectly entire or sometimes again dissected, almost veinless, opaque, above dark green, beneath pale; umbels distant in the panicle, pedunculate, many-flowered; calyx obsoletely toothed; styles two, reflexed at the extremity.

HAB. Dispersed through the mountains from Dandenong and Mount Macedon to the Buffalo Ranges, and through a great part of Gipps' Land.

The berries are bluish-white, like those of the following species, but somewhat smaller.

95. Panax *dendroides*, F. Muell.; arborescent, unarmed, smooth; leaves simply or bipinnate; leaflets in five to seven pairs, lanceolate, acute, entire, opaque, beneath paler, above with prominent veins; umbels many-flowered, forming a divaricate panicle, which is of equal length with the leaves; calyx with five short teeth; styles two, reflexed from the base.

HAB. Not rare in the valleys of the southern and eastern ranges of this Colony.

(*To be continued.*)

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2.
1.
4.
3.

[illegible]

On Duttonia, *a new Genus of* Myoporineæ *from* South Australia; *by* Dr. F. Mueller, Government Botanist for the Colony of Victoria.

(Plate I.)

Duttonia.*

Gen. Char. Calyx profunde 5-partitus, persistens; laciniis patentibus, lineari-subulatis. *Corollæ* intus dense barbatæ tubus brevis, cylindricus; faux ampliata; limbus bilabiatus, labio supero acute bidentato, infero tripartito. *Stamina* didynama, inclusa, filamentis 2 supra corollæ basin insertis, 2 cæteris brevioribus; *antheræ* biloculares, loculis divaricatis. *Stylus* simplex, glaber, stamina superans, apice uncinatus. *Ovarium* oblongum, 2–4-loculare, loculis 2 fertilibus; ovulis solitariis, apice loculi pendulis. *Capsula* oblonga, obtusissima, leviter compressa, calyce brevior, bilocularis, loculis incomplete bilocellatis. *Semina* in locellis solitaria, linearia.—Frutex *oræ meridionalis* Novæ-Hollandiæ, *facie* Eriostemonis gracilis.

1. Duttonia *gibbifolia*, Ferd. Mueller.

Hab. In montibus petræis juxta rivulum "Mount Barker Creek" (Coloniæ "South Australia").—Anth. vere.

Frutex hirtellus v. puberulus, patentim ramosus, ramis tenuibus teretibus, ramulis subhirtellis. *Folia* alterna, demum decidua, lineari-oblonga, subacuta, puberula, plano-convexa, coriaceo-carnosa, enervia, sessilia, sed non decurrentia, ramulis appressa, $1\frac{1}{2}$–2''' longa, scabra, supra impressa, subtus convexa, tuberculis confluentibus distinctisve gibba, iis igitur *Eriostemonis gracilis* et *halmaturorum* non absimilia. *Flores* axillares, sessiles. *Calycis laciniæ* e latiore basi tenuissimæ, 2''' longæ, patentim recurvatæ. *Corolla* calycem duplo superans, extus et prope basin intus glabriuscula, lobi labii superioris fere deltoidei vix lineam longi. *Capsula* ad apicem valde compressa, 2–3''' longa, glabriuscula, indehiscens?

Plate I. Fig. 1, leaves; 2, portion of branch, leaves, and flower; 3, flower laid open; 4, stamen; 5, immature fruit:—*all magnified.*

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* *Duttonia*, Sonder, antea in Linnæa, xxv. p. 409, divulgata, sed jam anno 1851 descripta, *Dimorpholepidi* jure prioritatis subjungenda est.

Balsam-bog (Bolax glebaria, *Comm.*); *by* SIR W. J. HOOKER, K.H., F.R.A. and L.S.

Among the most remarkable of plants peculiar to the Polar and sub-polar regions of the Southern hemisphere, will undoubtedly rank the *Bolax glebaria*, first discovered by Commerson in Tierra del Fuego; in Good Success Bay by Banks and Solander; by Mr. Webster in Staten Land; by Dr. J. D. Hooker in Hermite Island; and by Pernetty, Gaudichaud, and D'Urville in the Falklands, where it is familiarly known to the English settlers under the name of "Balsam-bog," but is called "Gommier" by the French voyagers. It is also in great perfection in Patagonia, and even on the Andes of Peru and Bolivia, according to Dr. Weddell. In 1764, when the French formed an establishment on the Falkland Isles, the Abbé Pernetty, the historian of the voyage, speaks thus of the face of the country on the first landing:—"Deceived by distance, we had expected to find a perfectly dry and barren country; but no sooner had we set foot on *terra firma*, than we saw everywhere a tufted herb, a foot or a foot and a half and more high, growing even upon the loftier hills, which we had great difficulty in ascending, from the obstacle which this plant opposed to our progress. Our fatigue was excessive. There were no tracks among this herb, which appears to have vegetated there since the foundation of the world. We broke into the decaying masses formed by it, up to our knees; and the soil beneath, nearly black, was but the vegetable detritus of the decayed shoots of successive years, which felt elastic under the feet in consequence of the interwoven roots. . . . Luckily we had provided ourselves with small sealed bottles of brandy and a few ship-biscuits, which proved of great use in supporting our strength under the heat and fatigue which we endured."

Pernetty, a few days after, speaks of the resinous qualities of this herb; and its abundance upon a little island, which they afterwards named *Ile Brûlée*, because the Commander of the expedition, M. de Bougainville, ordered fire to be set to these plants, "pour rendre plus facile le défrichement des terres," notwithstanding the remonstrances of M. Pernetty, who represented that "tout le pays étant couvert de foin, le feu gagneroit de proche en proche, peut-être même toute la surface de la Terre-ferme, s'il n'étoit pas arrêté par quelques rivières; que d'ailleurs ce feu détruiroit tout le gibier." The fire was repeated

on the mainland, and "les Gommiers" continued burning for some days. The new colonists afterwards made a better use of these great hillocks of vegetable resin, as fuel in cooking their provisions.

The nineteenth chapter of this interesting voyage is devoted to the "Natural History of the Islands;" and the very first object noticed, and described with remarkable accuracy for one who makes no pretensions to a scientific acquaintance with the works of Nature, is this plant. "The productions of the soil," he says, "are amongst the first objects which attract a physical traveller on landing on the Iles Malouines [the French name for the Falklands]. There are, on the heights, massy green lumps, or hummocks, sometimes rising three feet and more above the soil. I studied attentively one of these hillocks, and I observed that there exuded a resinous gum, at first white when it is soft, but amber-coloured when dry. I collected several grains, and found them to yield an odour at least as strong and as aromatic as that of incense; but, at the time, I could not determine the precise relationship this exudation bore to other known resins or gums. I brought away with me about the weight of a 'demi-gros' in drops, some of the size of a round pea, others as large as a kidney-bean; and on my return to the ship I exposed some on the point of a knife to the flame of a candle. The substance blazed like a fine resin, exhaling an agreeable odour, and depositing a black oil, which was not inflammable, and which, when cold, became hard and brittle. I tried in vain to dissolve this oil in water, and was hence led to consider that it would make an excellent varnish. M. Frontgousse, surgeon of the 'Sphinx,' having collected some of this gum, imagined from the odour and from the taste that it was gum ammoniac; and on comparing the two, we found the same taste and the same smell, and the same residuum on burning. The odour is so permanent on the fingers, that during the whole of that and the following day I could not remove it, though I washed my hands repeatedly, and even with salt-water. In spirits-of-wine this gum-resin dissolves only partially, and tinges the spirit with the colour of amber: what remains becomes spongy, and burns as before it was dissolved: the third residuum does not dissolve in water; aquafortis has no effect upon it.

"These hummocks are *formed by one single plant*, which throws out light spongy stems, whose lower foliage gradually decays, like that of a Palm. The leaf is cut into three segments (accurately represented

in a very rude figure); it is of the size of the Water Purslane, but of a fine green colour. These leaves are much crowded all round the stem, and each is slightly umbilicated in the centre. Collectively these tufts form, at the apex of the branch, a kind of depressed pyramid, composed of leaves placed close to each other in an imbricated manner, like the scales of an artichoke. [The Abbé's bird's-eye view of the apex of a branch is also correctly rather than elegantly figured.]

"From the heart or centre, and from the torn edges of the leaves, or if they are only chafed, or at seasons when the plant is surcharged with resinous liquor, this gum-resin exudes, and congeals in the air. When the plant is cut or torn, or merely rubbed on the surface, a white, creamy, and viscid substance flows, which sticks to the fingers like glue, and is very adhesive.

"The interior of these hummocks is hollow, the crust or surface supported, as it were, by the stems and the branches, of which the leaves, not exposed to the air, are brown and decayed; *sometimes other plants vegetate in the interior of this vault*, emerge into daylight through the mass, and flourish above it. When these lumps are perfect, they are very firm and solid, so as not only to bear a man seated upon them, but the whole weight of a man in walking over them; nevertheless a sudden and violent kick of the foot easily breaks into this hollow, and with the hand large masses may be wrenched away. The broken roots and stems also yield the same white resin, which flows from the wounds like the milky juice of an *Euphorbia*."

Lastly, towards the close of the same chapter, after describing other plants, M. Pernetty reverts to his favourite *Gommiers*, in connection with a kind of Heather, evidently the *red-fruited Crowberry* (Empetrum rubrum). "It is found very commonly growing out of the *Gommiers*, in such a manner as to lead to the belief that it is a branch (or tuft) of the same plant, with different leaves, and bearing (scarlet) fruit."—"This *Gommier* is only green upon the surface, because the leaves scarcely exceed a quarter of a line in length; they are, so to say, glued together and arranged in a rose-shaped manner. The flower so much resembles the seed-vessel as easily to deceive one. This capsule very much resembles that of Anise, but it is 'd'un gris de terre.' I have seen hummocks of this plant more than ten feet in their widest diameter, and four and a half feet in height; ordinarily they assume a nearly spherical form, but the largest have the form of a potato cut through the middle."

Probably the Abbé Pernetty, though likening the small fruit to that of the Anise, had not the most distant conception that it belonged to the same Natural Family, viz. the *Umbelliferæ;* the habit, aspect (or port) of the plant being so exceedingly unlike any Umbellifer of the northern hemisphere. Some of the densely-tufted alpine Saxifrages, with divided leaves, have more the appearance of this singular production, but on a very small scale. From a sketch made by Dr. Hooker on the spot, there is a woodcut, published in Sir James Ross's 'Voyage to the Southern Seas,' vol. ii. p. 303; and that is, as far as we know, the first and only figure* which represents a group of these plants *in situ:* and the most accurate representation of a small portion of a hummock, and its botanical analysis, are those given in the 'Icones Plantarum,' vol. v. tab. 492; by which it will be seen that this huge plant, when in its original and most perfect state, namely, with root, stem, flower, and fruit, is yet among the smallest of the Natural Family *Umbelliferæ;* and that the great bulk of these large specimens is due to the successive prolongations of the apices at the surface of hummock, all rising from one original root. The 'Flora Antarctica' of Dr. Hooker, again, enumerates all the synonyms of the plant: so that we have no need to offer a scientific description of it on the present occasion. It will be more to our purpose to offer an extract from the most recent author on the subject, in the work last mentioned (vol. ii. p. 286).

"Long before the Falkland Islands were colonized, from Britain," says Dr. Hooker, "the present plant had excited considerable curiosity, by the remarkable mode of growth it there assumes, and its forming a feature in the landscape, that strikes the most casual observer. Now that these islands have been annexed formally to the British dominions, the *Bolax*, or *Balsam-bog*, assume a still greater interest. In whatever portion of this country the voyager may land, he cannot proceed far along the beach without entering groves of *Tussac* or *Tussock* (Tussac-grass, *Dactylis cæspitosa*), whose leaves often wave over his head; nor turn his steps inland without seeing, scattered over the ground, huge, almost spherical, hillocks, of a pale, dirty yellow-green colour and uniform surface, so hard that one may break the knuckles on them. If the day be warm, a faint aromatic smell is perceived in their neighbourhood, and drops or tears of a viscid white gum are seen to flow from

* Copied, and coloured to the fancy of the artist ("*J. C. Frank del. et lith.*"), in the 'Popular Geography of Plants,' lately published.

various parts of this vegetable mass. The plants stand apart from one another, varying from two to four feet in height, and though often hemispherical, are at times much broader than high, and from eight to ten feet wide in the greatest diameter. The very old ones begin to decay near the ground, where a crumbling away commences all round; and having but a narrow attachment, they resemble immense balls or spheres, laid upon the earth. Upon close examination, each mass is found to be herbaceous throughout, the outer coat formed of innumerable little shoots, rising to the same height, covered with imbricated leaves, and so densely packed that it is even difficult to cut out a portion with a knife, while the surface is of such uniformity that Lichens sometimes spread over it, and other plants vegetate on its surface, in the occasional holes or decayed places.

"If at a very early period a young plant of the *Bolax* be removed and inspected internally, the origin of these great balls may be traced; for each of them, however large, is the product of a single seed, and the result of many, perhaps hundreds of years' growth. In a young state, the plant is furnished with a very long, slender, perpendicular root, like a whip-lash, that penetrates the soil, producing at its summit two or three small branching stems, which divide again and again, radiating regularly from the centre, instead of being prolonged vertically; these send out lateral shoots from their apices, and in such numbers that the mass is rendered very dense, and by the time the plant has acquired the diameter of a foot, it is quite smooth and convex on the surface. The solitary root has become evidently insufficient for the wants of the mass of individuals, which are now nourished by fibrous radicles, proceeding from below the leaves, and deriving nutriment from the quantity of vegetable matter which the decayed foliage of the lower part of the stems and older branches affords. The species yields a gum, which is white when oozing from the stems and leaves, but soon turns red-brown on drying. It has been used as an application to cuts and other lesions with apparent effect."

Living, or dead and dried, it could not but be desirable that so remarkable a vegetable production should be brought to England; but all our attempts to procure it were in vain till the present time (February, 1855), when the late Governor of the islands, George Rennie, Esq., had the extreme kindness, and with no small labour and expense, to bring home with him a very fine specimen for the museum of the

Royal Gardens, Kew, and in the most perfect state of preservation. At the railway station this single box, with its solitary specimen (including the soft packing materials, filamentous Lichens,) was found to weigh 547 lbs. Deducting the strong case, 234 lbs., and the soft packing, 10 lbs., we have 303 lbs. as the actual weight of the specimen. It was an interesting occupation for stay-at-home travellers to witness the opening of the case. The very packing-stuff had charms for the Cryptogamic botanist, consisting, as just observed, of the filamentous Lichens of the country; they consisted of noble specimens of the *Usnea melaxantha*, Ach. (figured in Hook. Bot. Misc. vol. i. p. 15, tab. 2, under the name of *Usnea sphacelata*, Br., a species both Arctic and Antarctic, and inhabiting the higher mountains of the Andes even under the Equator), several states of the ubiquitous *Usnea barbata* and *plicata*, together with many remarkable varieties of *Ramalina scopulorum*, severally in copious fructification; and no better package could possibly have been employed. They retained a certain degree of moisture, were soft and elastic, not in the least disposed to heat or decay; all looked as fresh and as bright-coloured as if they had been that day gathered from their native rocks,—a lesson for those who have occasion to pack many living plants for long voyages.

On the removal of the Lichens the hummock of the *Bolax glebaria* came fully into view, exactly corresponding with the general descriptions extracted above from the writings of the Abbé Pernetty and Dr. Hooker; its broad base rested firmly on the bottom of the box: it required four men to remove it. Its shape is an irregular hemisphere, 2 feet high, 3½ feet broad in its greatest diameter; the circumference at the base 10 feet; and it measured from side to side, carrying the line over the summit, 6 feet 3 inches. Externally it forms a compact, nearly even crust, consisting of the stellated or rosulated ultimate shoots of the plant, so closely packed that not a pin's breadth of vacancy can be perceived between them. Beneath is a cavity, how deep we know not, occupied by decayed vegetable matter, the detritus of former years, root and stem and leaves,—a perfectly black soft mould. This has not only afforded nutriment to the surviving limbs of the parent plant, but to a foreigner also; for, exactly as described by Pernetty, there has emerged from the side of the crust, near the base, a very fine specimen of the *Empetrum rubrum* (an exact representative of our northern Craneberry, *Empetrum nigrum*, only bearing red

instead of black berries), a tuft a foot in length; and from the very summit of the *Bolax* rises another specimen of *Empetrum*, forming a crest to the hummock.

The specimen is accompanied by a bottle filled with the gum-resin, in its present state of a dirty amber-colour, odorous, firm, but moderately soft, and very adhesive, becoming fluid with heat.

We should do injustice to Mr. Rennie did we not also acknowledge his attempts to bring home young living specimens of this rarity. Several were placed in a Wardian case and carefully attended to on the deck of the vessel, and conveyed safely as far as the latitude of Portugal; when such a storm came on as swept the decks of every movable object, and compelled the Captain to put, in distress, into Lisbon, whence the Governor, with the remainder of his treasures, soon proceeded in the mail-steamer to England. Mr. Rennie has set a good example for his successors to follow; and as the Royal Gardens now possess living plants of the *Tussac Grass* and the *Antarctic Beeches* from the high southern latitudes; the *African Teak* from the interior of Sierra Leone; the *Rice-paper*, from Formosa; the *Wax-Palms* and *Phytelephas*, from South America; the *Ouvirandra fenestralis*, from Madagascar, etc.,—plants almost despaired of in former years,—so we are sure some kind friend will ere long supply us with vegetating specimens of *Bolax glebaria*.

A box separate from the one above mentioned, brought to us also by Mr. Rennie, contains museum specimens of the following rare and very remarkable Seaweeds, peculiar to those southern latitudes:—1. *D'Urvillæa Harveyi*, Hook. fil. (Fl. Antarct. vol. ii. p. 456, tab. 165 and 166); 2. *Lessonia fuscescens*, Bory (Hook. Fl. Antarct. vol. ii. p. 457, tab. 167, 168, and 171); our stems below branching at the top, measure 12 feet in length; this seaweed grows upright and forms submarine forests with its copious floating foliage. Sections of the stems are used for knife-handles by the Gauchos, and become hard and transparent like horn. 3, 4. *Lessonia nigrescens*, Bory, and *L. ovata*, Hook. fil. and Harv.,—probably too near *L. fuscescens*. 5. *Macrocystis pyrifera*, Ag., whose stems are said to attain, at a moderate computation, a length of seven hundred feet!—the longest of any known plant.

BOTANICAL INFORMATION.

Herbarium of the Two RICHARDS.

The present possessor of the very extensive Herbarium formed in Paris by the talented Claude Louis Richard and his late son, Professor Achille Richard, being about to be absent from France for a considerable length of time on a voyage to America, has come to the resolution to dispose of the collection; in what particular manner is not yet stated; but we are requested to announce in our Journal the following general list of its contents:—

1. *Herbier général*, classé suivant le 'Genera Plantarum' de A. L. De Teysieux, avec un catalogue. 27,150 espèces environ.

2. *Herbier de l'Ile de Cuba*, plantes récoltées par M. Ramon de la Sagra, ayant servi à la publication de la Flore de l'Ile de Cuba, par A. Richard. 4464 espèces environ.

3. Doubles et triples de *l'Herbier de l'Ile de Cuba.*

4. *Herbier d'Abyssinie*, plantes récoltées par les Drs. R. G. Dillon et A. Petit, ayant servi à la publication de la Flore d'Abyssinie, par A. Richard. 7812 espèces environ, un grand nombre d'échantillons.

5. *Herbier de Sénégambie*, plantes récoltées par MM. Heudelot et Leprieur, plantes ayant servi à la publication de la Flore de Sénégambie, par A. Richard. 900 plantes environ.

6. *Herbier de la Guyanne Française* et *des Petites Antilles*, plantes récoltées par *Louis Claude Richard*, accompagnées de dessins, analyses, etc., faits par *L. C. Richard.* 2664 espèces environ, un très grand nombre d'échantillons.

7. Plantes de la Guyanne Française de M. Leprieur, 744 espèces.

8. Plantes du Brésil, provinces de Rio-Janeiro, Minas-Geraes, St. Paul, plantes récoltées par M. Ch. Vauthier. 4050 espèces environ.

9. Plantes de la Nouvelle-Zélande, du voyage de 'l'Astrolabe' de M. Dumont-D'Urville, ayant servi à la publication des plantes de la Nouvelle-Zélande, par A. Richard.

10. Herbier des environs de Paris, 12 cartons. Cryptogames, 37 cartons.

Plantes françaises, 600 espèces environ. Plantes de Naples et de Sicile, 600 espèces environ. Plantes de Chine. Plantes de Bourbon et de Madagascar, 600 espèces environ. Algues marines, un gros paquet.

Plantes des Indes. Plantes du Cap de Bonne-Espérance, Acacias et Proteaceæ de la Nouvelle-Hollande.

Nota.—Les plantes de l'Amérique du Nord, de *Michaux*, publiées par *L. C. Richard*, font partie de *l'Herbier-général.*

NOTICES OF BOOKS.

GÉOGRAPHIE BOTANIQUE RAISONNÉE, *ou Exposition des Faits principaux et des Lois concernant la Distribution Géographique des Plantes de l'époque actuelle; par* M. ALPH. DE CANDOLLE, etc. 2 vols. 8vo. Paris.

(*Continued from p.* 64.)

The second volume of M. de Candolle's Work opens with a continuation of the Second Book, which is devoted to Geographical Botany, as contradistinguished from Botanical Geography, and with Chapter 8, which is devoted to the changes that affect the localities inhabited by species, or in other words, that affect the distribution of species. The subject of Naturalization here holds a prominent place, and M. de Candolle commences with defining the term as he understands it. A species he considers to be completely naturalized which is found to be, to all appearance, in the same relative conditions as the indigenous species amongst which it is growing: that is to say, it grows and multiplies without the agency of man; it appears constantly; it is more or less abundant in the localities that suit it; and it has existed for many years, during some of which the climate has been exceptional. The proof therefore of a plant being naturalized must rest upon historical evidence.

On the other hand, a plant is not to be considered as naturalized, which, when introduced by the agency of man, only propagates itself by roots, without ripening its seeds, or at least spreading by means of them. To this category the *Robinia Pseudacacia*, *Rhus*, and *Ailanthus* belong, in Europe.

Many difficult questions as to what plants are to be called naturalized, arise from the complexity of the phenomena depending indirectly upon man's agency; thus many species are only known to inhabit cultivated ground, and other artificial localities, whilst another and a large

class are the parasitical *Fungi*, etc., which infest our cereals, and even our chemical infusions, etc.

The causes of transport are very fully discussed under this Chapter; the obstacles to naturalization; and the proofs or indications of a species being naturalized.

Under the same Chapter is included a very able critical article on the Naturalized Plants of Great Britain, from an examination of whose origin and limits M. de Candolle draws the following conclusions:—

1. Only about 83 species can, with any tolerable degree of certainty, be stated to have become naturalized since the eighteenth century.

2. Of these 83, 10 are North American.

3. None of the remaining 73 can be assumed to have been imported from islands, all being very widely distributed continental species: 23 are not found wild, nor even partially naturalized in those parts of the continent which are nearest to England, as Holland, Belgium, and Western France.

4. The 23 species, not found on those parts of the Continent nearest to England, must all have been introduced by man, with seeds of cereals, garden-plants, or ballast, etc.; had birds or the winds or currents transported them, they would certainly have been found in the intermediate countries.

These species are—

Arabis Turrita, *L.*	Valeriana Pyrenaica, *L.*	Rumex alpinus, *L.*
Dianthus plumarius, *L.*	Nardosmia fragrans, *Reich.*	Iris tuberosa, *L.*
Silene Italica, *Pers.*	Senecio squalidus, *L.*	,, xiphioides, *Ehr.*
Astrantia major, *L.*	Petasites albus, *Gærtn.*	Crocus vernus, *Willd.*
Myrrhis odorata, *Scop.*	Hieracium aurantiacum.	Lilium Martagon, *L.*
Lonicera Caprifolium, *L.*	Cyclamen hederæfolium.	Allium Ampeloprasum, *L.*
,, Xylosteum, *L.*	Linaria purpurea, *Mill.*	,, ambiguum, *L.*
Asperula Taurina, *L.*	Acanthus mollis, *L.*	

Of this list, 3 have spread from the Botanic Gardens of Cambridge and Oxford, namely, *Arabis Turrita*, *Lonicera Caprifolium*, and *Senecio squalidus;* and the majority of the others are plants that have been much cultivated.

5. Two species are natives of Portugal and the Azores, but are unknown in Western France, viz. *Sisymbrium polyceratium*, L., and *Alyssum maritimum*, L.; their presence however is not therefore to be attributed to the action of winds and currents; for the first is known to be an escape, and the second is a very much cultivated plant.

6. The 48 remaining species are divided into—those cultivated in fields, parks, and gardens (29); those easily transported in ballast, or mixed with other seeds (9); and those that are not to be accounted for by culture or facility of transport: the list of these latter we shall cite, as they give rise to much curious speculation:—

Geranium Pyrenaicum, *L.*	Datura Stramonium, *L.*	Veronica Buxbaumii, *Ten.*
Sedum dasyphyllum, *L.*	Scrophularia vernalis, *L.*	Lamium maculatum, *L.*
,, album, *L.*	Linaria supina, *Desf.*	Euphorbia Cyparissias, *L.*
Pyrethrum Parthenium, *L.*		

7. Of the whole 70, only one remains, whose existence is very anomalous, the *Ononis reclinata*: this may have been conveyed by currents or birds, but M. de Candolle inclines to the supposition that it was more probably introduced by man.

8. The 10 North American species are all garden-plants, or otherwise certainly introduced by man's agency.

9. The majority of the naturalized plants inhabit the South of England.

10. Of the 83 species, 19 are annual, 8 biennial, 52 have perennial roots only, and 4 are woody-stemmed.

11. The Dicotyledons bear a greater proportion to the Monocotyledons amongst the naturalized than they do amongst the indigenous species.

12. The proportion of species with a pappose seed is very small.

13. One aquatic alone is included in the list (*Anacharis Alsinastrum*).

14. The absence of saline plants is most remarkable.

15. There is but one Leguminous plant; though the seeds of that Order are so easily preserved, and so many species grow in the parts of the Continent very near to England.

16. The greater number are found on old walls or in very artificial localities.

17. The number of naturalized species has been increased by 55 since the publication of Ray's 'Synopsis,' by Dillenius, in 1724; of this number, 19 have been introduced since the year 1800.

18. Within the last 3000 years it appears that, while man has been directly instrumental in introducing species, it is very doubtful if the winds, currents, or birds have imported one during that long period; certain it is, that these causes have introduced no alpine, aquatic, or woody plant.

A long and extremely interesting article is devoted to the naturalization of plants imported from great distances into different parts of the world, as Europe, the United States, India, etc.; but it is impossible, within our limits, to go into this. With regard to the tropical and subtropical species especially, the limits of the species are often so disputed, that the data upon which the arguments are founded have a different value in the opinions of different naturalists; for that special knowledge of all the conditions, physical and others, under which the plants are found in countries with which the author is not intimately acquainted, being necessarily wanting, he is obliged to rely upon sources of information of extremely different value. That some of our own best local botanists differ as to the indigenous or exotic origin of many of our common English plants, is notorious; but the wrong conclusions that must arise from this source of inevitable error, are, thanks to M. de Candolle's greater general acquaintance with European botany and with the physical features of Europe and its flora, considerably reduced. The lists given, and the discussions that accompany them, are however of the greatest value, not only from the immense amount of valuable information brought together, but from the skilful manner in which they are arranged for analysis. Upon such a subject, an author can, in the present state of knowledge, be a pioneer only, and as such, M. de Candolle has here done his duty admirably.

Under the discussion upon tropical plants which are common to Asia, Africa, and America, and have probably been transported from one of these countries to the others, a list of the principal ones are given, which, as being of great value, we here quote.

1. *Tropical Species, now common to Asia, Africa, and America, but probably transported from the Old World to the New, or from the New to the Old.*

Argemone Mexicana, *L.*	Cassia occidentalis, *L.*	Hyptis spinigera, *Lam.*
? Cleome pentaphylla, *DC.*	,, Fistula, *L.*	Leucas Martinicensis, *Br.*
Mollugo nudicaulis, β, *Fenzl.*	? Crotalaria incana, *L.*	Leonotis nepetæfolia, *Br.*
Urena lobata, *L.*	,, retusa, *L.*	Chenopod. ambrosioides, *L.*
? Sida spinosa, *L.*	Rhizophora Mangle, *L.*	Cyathula prostrata, *Blume.*
? ,, stipulata, *Cav.*	Ageratum conyzoides, *L.*	Alternanthera sessilis, *Br.*
,, cordifolia, *L.*	Bidens pilosa, *L.*	Amaranthus spinosus, *L.*
Hibiscus esculentus, *L.*	Sphenoclea Pongatium, *DC.*	Euxolus viridis, *Moq.*
? ,, tiliaceus, *L.*	Scævola Lobelia, *L.*	,, caudatus, *Moq.*
Zornia diphylla.	Hyptis pectinata, *Poit.*	? Achyranthes fruticosa, *Lam.*
,, var. glochidiata, *Benth.*	,, brevipes, *Poit.*	? ,, aspera, *L.*

? Achyranthes argentea, var.
„ δ, virgata, *Moq.*
? Desmodium triflorum, *DC.*
Abrus precatorius, *L.*
Parkinsonia aculeata, *L.*
Acacia Farnesiana, *Willd.*
Guilandina Bonduc, *L.*
Vinca rosea, *L.*
Ipomœa Pes-capræ, *Br.*
? „ tuberculata, *R. et Sol.*
? Batatas pentaphylla, *Choisy?*
? „ paniculata, *Choisy.*
Heliophytum Indicum, *DC.*
Physalis angulata.
? Canavalia obtusifolia.
Clitoria Ternatea, *L.*
? Phyllanthus Niruri, *L.*
? Eleusine Indica, *Gærtn.*
? Dactyloctenium mucronatum, *Willd.*
Cenchrus echinatus, *L.*

2. *Species probably transported from Africa to America, or* vice versâ, *but which are not found in Asia or Australia.*

? Sida rhombifolia, *L.*
? Urena Americana, *L.*
Triumfetta Lappula, *L.*
„ rhomboidea, *Jacq.*
Drepanocarpus lunatus, *Mey.*
Ecastaphyll. Brownei, *Pers.*
Mucuna urens, *DC.*
Schranckia leptocarpa, *DC.*
Mimosa asperata, *L.*
Desmodium incanum, *DC.*
„ tortuosum, *DC.*
Cassia obtusifolia, *L.*
Bidens leucantha, *Willd.*
? Schwenkia Americana, *L.*
? Capraria biflora, *L.*
Chrysobalanus Icaco, *L.*
? Hyptis atrorubens, *Poit.*
? „ obtusifolia, *Br.*
? Chenopodium fœtidum, *Schrad.*
Telanthera frutescens, *Moq.*
„ maritima, *Moq.*,
„ var. α.
Alternanthera Achyrantha, *Br.*
Iresine vermicularis, *Moq.*
„ aggregata, *Moq.*
Boerhaavia paniculata, *Rich.*
Commelyna agraria, *Kunth.*
Remirea maritima, *Aubl.*
? Sporobolus Virginicus, *Kth.*
? Stenotaphrum Americanum, *Schrank.*
Poa ciliaris, *L.*

3. *Tropical Species, now common to America and Asia, or to the Islands of the Pacific, and probably transported thither.*

Tribulus cistoides, *L.*
Tephrosia piscatoria, *Pers.*
Poinciana pulcherrima, *L.*
Asclepias Curassavica, *L.*
? Ipomœa Pes-tigridis, *L.*
Quamoclit vulgaris, *Choisy.*
Hyptis capitata, *Jacq.*
„ spicata, *Poit.*
„ suavolens, *Poit.*
Gomphrena globosa, *L.*
Pisonia aculeata, *L.*
Mirabilis Jalapa, *L.*
„ dichotoma, *L.*

The following are the conclusions derived from the above, and other facts of the same kind, cited by the author:—

1. The Old World has received more species from the New than *vice versâ.* This appears to be owing to the easterly direction of the great currents between America and Africa, and between Africa and India.

2. The total number of species thus transported is absolutely insignificant, compared with the whole extent of the tropical Floras.

3. The majority of naturalized species appear to have been transported by man, there not being more than 15 or 20 species that can have been transported by currents. The result indicates that the disjunction of the Old World from the New preceded the creation of the

existing species, and further, that since the creation of the latter no intermediate large islands or archipelagos have existed.

4. The most active transport has been between the opposite coasts of America and Africa, and is due to the currents and the slave-trade.

5. The agency of man has hitherto been rather involuntary than voluntary.

6. The majority of the species are such as are easily propagated.

7. The species are very frequently littoral, or affect cultivated or artificial localities.

8. Certain families are very largely represented in the list; they are *Malvaceæ*, *Tiliaceæ*, *Leguminosæ*, *Convolvulaceæ*, *Labiatæ*, *Amarantaceæ*, and *Nyctagineæ*. Of these, the *Malvaceæ*, *Leguminosæ*, and *Convolvulaceæ*, have seeds capable of retaining their vitality during long exposure to immersion; others have seeds adapted to cling to foreign bodies, as *Tiliaceæ*, *Labiatæ*, and *Nyctagineæ*.

9. Most of the species are annual or woody.

A very curious description is given on the subject of plants which might be expected to have become naturalized, but which are not so, or, as M. de Candolle entitles it, "Exemples de Naturalisation manqués."

The difficulty of naturalizing plants at all is here forcibly dwelt upon, and the extremely small proportion of the many thousand species that have been introduced into our gardens, which eventually propagate themselves beyond those limits. Of a vast number which have been tried at the Bois de Boulogne, the *Potentilla Pennsylvanica* is the only one which is positively known to have established itself. In the neighbourhood of Geneva, one of M. de Candolle's friends has been in the habit during the last eighteen years of annually scattering many hundreds of seeds collected in the Botanical Gardens, but hitherto without any appreciable result.

A comparison between the facility with which plants are naturalized and the extent of the areas over which they are indigenous, affords no result in the present state of our knowledge. The last section of this Chapter is devoted to the contraction of the area occupied by a species. Artificial causes of course operate largely in diminishing the number of individuals, and hence of the area occupied by a species, and of these the most important are the draining of marshes and the cutting down of forests.

The data for facts of this class are necessarily rare, and are chiefly

negative; the best positive evidences of disappearance are the existence in peat-bogs, etc., of the remains of species not now inhabiting a country. Of these M. de Candolle mentions the cones of *Pinus Mughus* now found in the bogs of Ireland, of *Pinus Picea* and *Corylus Avellana* in the Shetland, and of *Betula alba* in the Faroe Islands.*

(*To be continued.*)

SEEMANN, DR. BERTHOLD: *Popular History of the* PALMS *and their Allies, containing a familiar account of their structure, geographical and geological distribution, History, Properties, and Uses, and a complete list of all the Species introduced into our Gardens.* Royal 16mo. With coloured Plates. London, 1855.

This is another contribution to Mr. Lovell Reeve's "Popular Series of Scientific Works;" and this particular subject could not have been put into better hands than those of Dr. Seemann, who may be said to have spent a great part of his life among Palms. As a school-boy ("one of fifty unruly ones, who needed a *cane* to keep them in order"), his first botanical lesson was derived from a Palm of the *cane* or *rattan* kind. These implements of punishment were abstracted from the master's custody whenever an opportunity offered, cut up into lengths by these young gentlemen, and used for smoking instead of cigars; but the stock in hand increased in the school-room, and some pupils, more curious than the rest, were induced to inquire where they came from, and of what plant they were the product. A Cyclopædia supplied the needful information, viz. that these canes were the stems of a slender East Indian Palm, a *Calamus*, and much used for making chairs and walking-sticks. At a more advanced period our author studied Palms in the hothouses of Germany, of Kew, and, latterly, on a more extended scale in the tropics of Asia and America.

The general plan of the work is similar to that of 'The Palm-trees of the Amazon, and their Uses,' by Wallace, noticed in our Journal, vol. vi. p. 61; but it is of course on a more extended scale, and confined to no particular region of the globe. But we do marvel to find that

* To which may be added, as more local examples, the Yews and Oaks found imbedded in the fens of Cambridgeshire, and a peculiar form of *Polyporus fomentarius* found on the Oak, of which a notice, by the Rev. M. J. Berkeley, has been read before the Linnæan Society of London (in February, 1856).—ED.

though Dr. Seemann is, by habit and education, as proved by his publications, a man of science, and though his book professes to be a "scientific work,"* the genera are all *alphabetically* arranged, whilst Mr. Wallace, who makes no pretensions to botanical science, has arranged all the genera and species in the order adopted by Dr. Martius in his learned and elaborate work on the Palms. But this is not all, for the *figures* of the Palms are also attempted to be arranged alphabetically; and there might have been some reason for this, as it might be supposed the object was to have the plates located opposite or near to the respective descriptions; *Acrocomia Mexicana*, for example, amongst the descriptions of *Acrocomia:* but no such thing; the plate of *Arenga* is the only genus beginning with A that is ranked under that letter, and that is not placed opposite to the description of *Arenga.* Figures of *Cocos* and *Copernicia* come among *Borassus.* The plate of *Phytelephas* comes amongst *Phœnix*, but no other whatsoever of the twenty plates is in juxtaposition with its respective initial letter: not one in the whole book with its respective genus. This, too, is the more tantalizing, because, though the plates are numbered, we find *no reference* to the plate under the descriptions. There is indeed a list of plates enumerated after the preface, though, being alphabetical like the plates, its use is not easily divined. Even the alphabetical arrangement must be taken with some allowance, for the plates, being mostly copied (with acknowledgment) from Martius, there are in several instances two different genera on one plate, a plan justifiable perhaps in the case of the very costly figures of the original work, but scarcely required here. And then, in this list of plates, we find *Nipa*, not under the letter N (though it is so in the description), but under A, immediately following *Arenga saccharifera.*

In regard to the plates themselves, the author, in his characteristics of the Family, dwells on "the dark green foliage of the waving Palms;" and Martius, from whom these figures are taken, represents, faithfully, the *bright green* of the majority of Palms; but that is a colour which seems wholly eschewed in this book; a scorching brown characterizes everything in the trees and landscape, save the dabs of blue for sky and water, so that we are sure Martius would not acknow-

* "It is not a purely literary production, but a *scientific work*, which, to meet the views of my publisher, has assumed a popular garb, in which mere literary considerations have been made subordinate to scientific accuracy."—*Preface*, p. xiv.

ledge them as imitations of his costly plates; and this ochraceous brown colouring is carried to such an extent in the frontispiece, representing the *interior of the Palm-house of Kew*, that it has called forth the just criticism in the 'Gardeners' Chronicle,' "If it were really like truth, the Palm-house must be a furnace in which nothing living could exist." The *outline* figures of Wallace are infinitely to be preferred to these; and Wallace has, besides, given some good figures and representations of spathas, spadices, and fruits, so that a tyro may form some notion of the inflorescence, of the flowering and fruiting of these "Princes of the Vegetable Kingdom." We are quite sure that the work would not be less popular if the faults we have noticed were corrected, and we are equally sure it would be more useful: it would lead the uninitiated to take greater delight in the wonders of the vegetable creation, and to a desire for a higher degree of scientific knowledge. We trust that what we have been led to complain of is not occasioned by a desire "to meet the wishes of the publisher." Certainly the publisher is no gainer, and we know, from Dr. Seemann's previous botanical writings, and the plates and analyses that accompany them (see, for example, the 'Botany of the Voyage of H.M.S. Herald'), that he is as willing as he is capable of making all needful corrections in a future edition: *Verbum sat.*

Taking, then, the most important part of the work, that which appeals to the mind rather than to the eye, it is deserving of great praise;—the descriptive part popular and not unscientific. The volume is dedicated to Humboldt, whose highly complimentary letter to the author on the occasion is given in the Preface. After a well-written Introduction, giving a general account of the Palms, our author has an essay on the geological and geographical distribution of Palms. The rest of the work is devoted (300 pages) to a "detailed History of Palms" from A to Z,—from *Acrocomia* to *Zalacca,*—the respective species under their proper genera in alphabetical order, not indeed of every Palm, but of those best worth knowing from their uses or curious structure and history, or from the fact of their being in cultivation in European gardens, and in that case accessible for inspection to those who are never likely to see a Palm in its native locality. Seemann estimates the number of known Palms at about 600 species; those in cultivation in our stoves about half that number. The former calculation is perhaps as much too low as the latter is too high. The almost

impossibility of preserving the gigantic leaves, flowers, and fruits, for the herbarium or museum and home study, the few scientific travellers that can describe them *in loco natali*, and the difficulties that even such have to contend with in procuring samples* and in the study of them, must greatly retard the progress of our knowledge of them; while, with regard to the enumeration of those in cultivation, the increased and increasing rage for multiplying species, whether from a love of notoriety in the attaching an author's name to a species, or from a love of lucre in the ready disposal of a plant with a new name, little dependence can be placed on our garden *Catalogues.* The amount of information on the useful history of Palms here collected is very great, and is most creditable to the author's researches and to his own personal observations during his extensive travels. All that is curious and remarkable, all that concerns the uses and properties of Palms, is here related in an agreeable manner; and so notorious are these, that the utility of Palms has become almost a proverb, as Mr. George Herbert has it in his poem entitled "Providence:"—

> "Sometimes Thou dost divide Thy gifts to man,
> Sometimes *unite.* The *Indian nut* alone
> Is clothing, meat and trencher, drink and cann,
> Boat, cable, sail, and needle, all in one."

There is therefore no lack of interest in this subject. The account of the *Areca*, or Betel-nut; the *Arenga saccharifera; Attalea funifera*, which yields a vast amount of one of the so-called *Piassaba* fibres, and the nuts for handles of bell-pulls, etc., and the *Attalea Cohune*, affording Cohune-oil; the *Borassus flabelliformis*, or Palmyra Palm, second in value only perhaps to the Cocoa-nut; the *Copernicia cerifera*, or Brazilian Wax-Palm, whose trunk, beset with spiral knobs, is clothed with a natural vegetable wax; *Calamus*, yielding the Rattans; *Chamærops* (dwarf Palm), which, together with the well-known Date (*Phœnix dactylifera*), are among the few extratropical Palms; the Doum Palm of Egypt (*Hyphæne Thebaica*), remarkable for its branching stem and for its

* Humboldt especially alludes to the difficulty and almost impossibility of procuring the flowers of many species, for drawing or preservation; but Seemann ridicules any notion of difficulty, observing that the learned author has omitted to mention that some botanists have it perfectly in their power to obtain the blossoms, viz. "by climbing the trees." We should be sorry to make the attempt ourselves, or even to see Dr. Seemann climbing the trunks of the "Prickly Pole" (*Acrocomia aculeata*), and not a few others described as "clothed with spines of greater or lesser length and thickness."

gingerbread-flavoured nuts; *Elæis Guineensis*, the *Oil Palm*, *par excellence; Euterpe edulis* and *E. oleracea*, the one affording a refreshing drink, the other (together with *Oreodoxa oleracea*), the so-called *Cabbage* of the Palm; *Lodoicea Sechellarum*, the famous double Cocoa-nut; *Phytelephas*, or Vegetable Ivory, and many others, cannot fail to prove attractive to persons of all ages and both sexes, to the ignorant as well as to those already instructed in Botany. The author says, with justice, in the Preface, "I may safely affirm, without the fear of contradiction, that there is no work in existence, in any language whatever, in which an equal amount of information such as here given is to be met with."

UNITED STATES EXPLORING EXPEDITION; Vol. XVI. Botany: Cryptogamia,—FILICES, *including* HYDROPTERIDES; *by* WILLIAM D. BRACKENRIDGE. *Large* 4to, *with a folio Atlas of forty-six Plates.* Washington, U.S.A. 1854.

We have had occasion to notice the first volume, or portion, of the 'Botany of the United States Exploring Expedition' (Phanerogamia), by Dr. Asa Gray. We have now the pleasure of announcing another portion of that work, of 357 pages, devoted to the descriptions of the FERNS, accompanied by an Atlas of Plates: and this is from the pen of Mr. Brackenridge, who had the great advantage of being one of the botanists of the Expedition, and consequently of seeing the species in their native locality, and gathering them with his own hands, a privilege enjoyed by comparatively few botanical authors. Notwithstanding the difficulties under which Mr. Brackenridge laboured for want of a good botanical library at Washington,—and we may add, too, for want of an authentic herbarium for comparison of species,—he has given to the scientific world a most beautiful and highly creditable work, with carefully-compiled and not too-laboured descriptions of such species as are considered new, observations on many of the old, the whole illustrated with a great number of excellent figures, drawn and engraved by a young artist, Mr. William S. Lawrence; of whom he says, "as it was his first attempt at this kind of drawing, and, not being constantly under my supervision, there frequently occurred omissions, or but partial representations of the minor details; such as the greater or less hirsuteness of the stipes, rachis, and costa, or in respect to other

appendages." We only trust that Mr. Lawrence will persevere in this line of his art, and we should have no fear of his rapid improvement, if he do but meet with the encouragement he deserves.

The arrangement here adopted, and the greater number of the divisions and genera, are acknowledged to be in accordance with Mr. J. Smith's views, though the author does not agree with Mr. Smith in the position he has assigned to several genera and species in his system; but he pays a just compliment both to him and Dr. Presl for the light which their investigations have thrown upon a family of plants, "the genera of which had been cumbrous and unmanageable, by the accumulation of heterogeneous masses of species." We find 702 species here enumerated (of which no less than 146 are described as new), included in 107 genera. Mr. Brackenridge had foreseen where his greatest difficulty lay, viz. in a just limitation of species, an error into which those, who have had greater advantages than himself, have too frequently fallen. To avoid this error it is not only necessary to consult a great number of works, which the libraries of Washington do not possess, but to have extensive suites of specimens from various countries, and compare one with another, with an unprejudiced mind, unshackled by the views of others, and see how the varieties pass into supposed species. "Of those which are here characterized as new, some probably have already been published, either as species which I have failed to identify, or in recent works" (and there are many such,) "which were not accessible to me. I can only say that I have endeavoured to prevent, as far as possible, such an occurrence, by diligently consulting all the authorities I could command. And in the large collection of Ferns made by the Expedition, most of them on islands in the Pacific Ocean, which have not heretofore been much visited by botanical collectors, and where humidity, heat, and shade, elements conducive to the production of Ferns, are combined in a high degree, surely as large a number of new species as are here proposed was naturally to be expected." Our own investigation of Ferns from the Pacific Ocean lead to rather different conclusions, and are more in harmony with the observation towards the close of the Preface, to the effect that one and "the same Fern has frequently been met with in two or more remote parts of the globe, clearly showing that species of this Family have a more extensive geographical range than has been generally supposed."

Our author however is too candid in his observations to allow us to suppose for one moment that he has added to the number of Ferns from the vain love of species-making, or from any want of care. All his new species are characterized, and the supposed distinctions carefully noticed, and in very many cases figured also, and no dogmatical opinion is anywhere expressed: the near affinities to other species, as well as the discrepancies, are alike noticed. No doubt every botanist is free to exercise his own judgment, and different botanists may be expected to entertain different views regarding the limitation of species as of genera; but the needless multiplication of names is not only itself an inconvenience, but it renders it more and more difficult for a tyro to determine with which of these many kinds the plant he is investigating best agrees; the differences being so small, and finding it not precisely to agree with any, he considers he has another new species to add to the list.

The very first species in the book before us, *Grammitis nana* for example, we consider to be truly *G. Australis* of Brown, which now rejoices in five names. Mr. Brown's *G. Australis*, and *G. Billardieri*, Willd., were published simultaneously in Germany and in England; Mr. Colenso considered that he had found a difference in the hairiness of the plant, and called it *G. ciliata*; Bory published it under the name of *G. scolopendrina*; but Dr. Hooker has shown that this little Fern has a wide geographical range. Specimens in our Herbarium prove it to be a native of Tasmania, Australia, Lord Auckland's and Campbell's Islands, New Zealand, Fuegia, Peru, the Sandwich and Falkland Islands, and Tristan d'Acunha.

Two new genera are proposed, one *Diellia* (comprising three species of the Sandwich Islands), "which differs from *Schizoloma* principally in the interrupted sori; in this respect it has a considerable affinity with *Synaphlebium*, but in that genus the costa is excentric or wanting." The two kinds figured are handsome plants, but surely very closely allied specifically; the third species (not figured) "is very distinct in character from the two others:" the plants are unknown to us. The second genus is *Dichlidopteris*, "which has the habit of *Monogramme*, but no lateral veins or indusium. Its nearest affinity is to *Blechnum*, from which it differs in habit, venation, and the thick, scarcely altered indusium; the fronds being so narrow that the sporangia of the two sori become confluent." Perhaps, in regard to the

two sori, Mr. Brackenridge has been misled by the artist, who has represented sporangia as arising from a filiform receptacle in the axis of the supposed indusia, at a distance from the costa; hence his character:—" *Venæ* simplices, rectæ, liberæ, *intramarginales*, nempe unica inter costam subtus prominentem et margines frondis angusto-linearis æquidistans, *receptaculum sporangiferum continuum* efformans." This we apprehend to be an error: and the supposed double or two-valved indusium, described by Mr. Brackenridge, he will find distinctly represented in one of the earliest figures of *Monogramme*, namely, *M. linearifolia*, Desv. Journ. Bot. 1813. vol. i. p. 22. tab. 2. f. 2 (*Pleurogramme immersa*, Fée), and thus described, "La fructification est recouverte par deux membranes qui se touchent vers la partie moyenne de la ligne, et s'ouvrent de dedans en dehors. Lorsque ces membranes sont ouvertes, la ligne formée par les capsules semble être cachée dans l'épaisseur de la feuille." In other words, the sorus is, in its younger state, sunk between the somewhat projecting margin of the adjacent portion of the frond, as in several nudisorous Ferns, for example *Antrophyum* (see Hook. Gen. Fil. tab. CIX. *A*. f. 3, and *Tæniopteris*, Hook. l. c. tab. LXXVI. *B*. f. 3). In a more advanced state these raised edges are concealed by the spreading of the sporangia; hence Fée, "Les deux côtés de la lame se creusent dans la *Pleurogramme immersa*, pour recevoir les sporanges, et le mésoneure qui fait office de réceptacle s'épaissit légèrement au point fructifère."—The plant is a true *Pleurogramme* of Presl.

JAUBERT *et* SPACH: ILLUSTRATIONES PLANTARUM ORIENTALIUM; *ou, Choix de Plantes Nouvelles et peu connues de l'Asie Occidentale.* Imp. 4to. Paris. Fasc. 44–47.

In the first of these fasciculi just mentioned, next after *Oliveria decumbens*, Vent., five rare oriental *Cruciferæ* are described, and figured from the drawings of the celebrated "*Vélins*" of the Museum of the Jardin des Plantes; viz. *Vesicaria Cretica*, Poir., *Crambe orientalis*, L., *Erucaria microcarpa*, Boiss., *Raphanus lyratus*, Försk., and *Didesmus Ægyptius*, Desv., var. *pinnata*. Tab. 437 represents *Swertia decumbens;* 438, *Primula verticillata*, Försk.; 439, *Primula Boveana*, Dcne.; and 440, *Primula Simensis*, Hochst.; 441, *Polygonatum orientale*, Desf.; 442, *Allium Neapolitanum*, Cyr; 443, *Chionodoxa Cretica*, Boiss. et Heldr.; 444, *Mal-*

vella Sherardiana, Jaub. et Spach; 445, *Physoleucus pachystachya*, Jaub. et Spach; 446, *Anarrhinum Arabicum*, Jaub. et Spach; 447, 448, and 449, *A. Abyssinicum*, Jaub. et Spach; 450, *A. orientale*, Jaub. et Spach; (Fasc. 46 has by some accident not been received by us;) 461, *Eremostachys macrophylla*, Montbr. et Auch.; 462, *E. pyramidalis*, Jaub. et Spach; 463, *Euphorbia cuneata*, Vahl; 464, *E. Perottetii*, Jaub. et Spach; 465 and 466, *Cluytia myricoides*, Jaub. et Spach; 467, *C. lanceolata*, Försk.; 468, *C. Abyssinica*, Jaub. et Spach; 469, *Erodium glaucophyllum*, Ait.; 470, *Rheum Ribes*, L.

DOZY, F., *et* J. H. MOLKENBOER: BRYOLOGIA JAVANICA. 4to. Fasc. VI., VII., each with five Plates. Leyden. 1855.

We are glad to find that the death of Dr. Molkenboer (whose name still continues on the cover) does not interrupt, or at any rate interrupts but temporarily, the progress of this valuable work, and that the Government has taken measures for its support. The figures, as is well known, are very full and satisfactory, after the model of those of Bruch and Schimper, and there can be no better. Fasciculus VI. contains a fine new *Diphyscium*, *D. mucronifolium*, Mitten, *Racolopus pilifer*, *Oligotrichum Javanicum*, *Pogonatum microphyllum*, *P. clavatum*, all new species of Dozy and Molkenboer. Fasciculus VII. is devoted to five plates of *Polygonatum*, viz. *P. Junghunianum*, *P. Teysmannianum*, *P. Teysmannianum*, *β. tortile*, *P. macrophyllum* (all new species of Dozy and Molkenboer), and *P. cirrhatum*, Sw.

DE VRIESE, DR. W. H.: *De* KINA-BOOM *uit Zuid-Amerika overgebracht naar Java*, onder de regering van Konig Willem III. 'S Gravenhage. 1855.

This pamphlet of 122 pages, in the Dutch language, gives an account of the successful introduction of the true or best *medicinal bark* (*Cinchona Calisaya*) into Java. Thanks to the kind offer of a Lady of the author's family, we shall be able shortly to give some interesting extracts in an English dress.

Notes on the VEGETATION *of the* Middle Island of NEW ZEALAND, *chiefly in the neighbourhood of Nelson, extracted from Letters written to the Editor by* DR. DAVID MONRO, of Nelson.

Two or three times in the course of the year I make a journey from this place (the Waimea), where I reside, to the Wairau, nearly one hundred miles distant by the bridle-path, though probably not above thirty in a straight line. For about forty miles I proceed in a southerly direction over a country of comparatively low level, though of very uneven surface, composed of ridges divided by steep and narrow valleys, and uniformly covered with moderately high Fern. In proceeding across this country we are, generally speaking, obliged to keep the summit of a ridge and follow it in its different windings. The vegetation in this tract of country is poor and very little varied: in the bottoms of the valleys and about the brooks there is some variety of shrubs, but the hills are possessed by Fern to the exclusion of almost everything else. A small species of *Phormium** grows upon the ridges here, part of the flower of which, I forget now whether the calyx or corolla, is green, and not dark red as in the larger variety. Another plant is very common, which from a bunch of sword-shaped leaves sends up a stalk about a foot high, bearing a white daisy-like flower about the size of a crown-piece: the native name of this plant is "Toocumé."† From the under surface of the leaf a cuticle strips off which has a strong resemblance to fine white kid-leather. This the natives of the South twist into yarn, making fishing-lines of it; and I have also seen this yarn woven into a soft and warm cloth, with which an excellent pair of leggings was made. A few shrubs are also met with about these ridges, some of them showy when in flower, but as my friend Mr. Bidwill has been over the ground, it is not likely that I shall find much that is new. Having travelled about forty miles in a southerly direction, I enter the Wairau Pass: this is a deep cleft in the mountain-chain which has been on my left, and which, interrupted only by this pass, continues its southerly bearing and joins the alpine ridges about the lakes Rotuiti and Rotueva, upon which the snow never melts. The pass is ten miles through and wooded from end to end. The trees are uniformly what the colonists call Black Birch‡ (Beeches,

* *P. tenax*, var. β, Banks et Sol. † Probably *Celmisia coriacea*, H.f.
‡ *Fagus fusca*, H.f.

I believe). The ground is covered with soft green Moss, and there is very little underbrush. In this wood about midsummer the beautiful epiphyte (a *Loranthus*, probably) is to be seen in flower in abundance. Having passed through this wood we emerged into the valley of the Wairau at a height of perhaps nearly 2000 feet above the level of the sea. The valley here consists principally of large stones, and the vegetation is very poor. About the river however and on the islands enclosed between its branches there is a considerable variety of shrubs, and many of them, I conceive, unknown; at least they are new to me. Of these I shall endeavour, upon my next journey to the Wairau, to get as many specimens as I can. The remainder of my journey is down a grassy valley, upon which nothing grows but grass, with here and there a plant of Anise,* or that vegetable porcupine which the colonists term Spear-grass.† On the banks of some of the streams which flow into the Wairau, a shrub is met with as yet I believe undescribed: I enclose you a few of the seeds, of which I happen to have some by me. It is an addition to a natural family which is very sparingly represented in this country—the *Leguminosæ*. The shrub grows to the height of eight or ten feet, and is in outward appearance almost exactly like what we call here the Spanish Broom [*Carmichaelia*]; but the flower is pink, small, and in clusters: when in full flower, about the month of December, it is very handsome. There is another shrub in the Wairau very common on dry rocky places, with a large white *Composite* flower, which I believe is undescribed. The leaf is about the size of the Laurel, of a pale glossy green, and thick; the under surface and the leaf-stalk are almost exactly like white cotton-velvet: I shall easily be able to get specimens of this.

I have made an excursion to the Rotuiti Lake, which lies about fifty miles to the southward of Nelson, but found very little there which seemed new *to me* or likely to be of interest to you. On my way back I was more fortunate. I ascended to the summit of the lofty range which divides the valley of the Waimea and Wairau, and from a mountain-top there, called Gordon's Nob, which is probably between 4000 and 5000 feet high, I gathered some plants which may be considered as alpine in this country, and which I trust may be new to you. I have not aimed, in sending you specimens, at presenting you with an epitome of the Flora of this district. The majority of the plants I have

* A species of *Anisotome*, H.f. † *Aciphylla squarrosa*, Forst.

sent will probably be already known to you. In picking up specimens I was chiefly guided by their being found at some distance from the seashore, and therefore, as I imagined, having less chance of being known to botanists than the vegetation of the low levels already explored by French naturalists and others. The collection I have sent you does not however include all that I could have wished or that I know of. There are several other shrubs and herbaceous plants that I shall endeavour to procure upon a future occasion, which I have reason to believe are still nondescript. As the country becomes better known and more opened up, the facilities of obtaining plants will be very much extended. Only last summer our pioneering sheepowners have pushed forward into a very elevated district,—the Fairfield Downs, which lies near the sources of the River Awatena, between the Port Cooper plains and Cape Campbell. In this district it will not be difficult to attain an elevation of 7000 feet, or thereabouts, above the sea: at this height you are in a country where snow in patches lies nearly throughout the year. I intend visiting this district next summer, and both from what I have heard from casual visitors of the place, and from the climate which it must enjoy, I feel sanguine that I shall find some things there which will possess considerable interest for you. I regret extremely, when on these expeditions, the very limited amount of my botanical knowledge.

You inquire about the trees in this district,—which are the highest, and other questions. Our loftiest and largest tree here is what the sawyers call White Pine; the natives, Kahikatea: it is a *Podocarpus*,* I believe. Trunks are not unfrequently four or five feet in diameter, and rise to a great height. This tree and the Pukatea, a gigantic Myrtle, indicate the very richest soils in the country,—deep alluvial soils, generally rather wet. On the drier alluvial soils the largest trees are the Mai,† the Red Pine of the sawyers, and the Totara,‡ a species of Yew. This last is a very picturesque tree, its branches twisting somewhat like the Oak, and growing to a great size: it splits with great freedom, and is, in consequence, the wood most in demand for fencing, laths, and shingles: it is also very durable in the ground, and is the tree of which the natives generally make their canoes. Both the Totara and the Mai grow, by preference, on rather gravelly soils. Another large forest-tree is the "Rimu," *Dacrydium cupressinum*. This also grows

* *P. dacrydioides*, A. Rich. † *P. spicata*, Br. ‡ *P. Totara*, A.C.

upon rather inferior soils, and ascends to a higher level than the Pines. Young specimens of this are very pretty, but the old tree has a very mournful funeral appearance: it is sawn up into timber, along with the trees I have mentioned before; but the timber, though rather ornamental, is not much esteemed. These are the only timber-trees of this district: they are the largest trees, and constitute the largest portion of the forest, upon the low grounds. Interspersed among them are smaller trees, the Titoki, the Miro,* the Taua,† and others. As you ascend to the higher levels these trees begin to be mixed up with an increasing proportion of what we call the Birches (Beeches), and at an elevation of say 1500 feet, the forest which clothes the hill-sides is entirely composed of these or nearly so. On the way to the Wairau, at the highest part of the road, we pass through a forest ten miles long: there is but one Pine to be seen in this from one end to the other, and, with the exception of here and there a *Fuchsia*, an *Aristatelia*, and a few other straggling undershrubs, the entire vegetation consists of these Beeches. That there are several species of them I am well satisfied, but how many I am altogether unable to say. I have fancied that the leaf changes its character according to the age of the tree; for under one of the trees, I have found a great number of seedlings, with leaves very different from that of the overshadowing tree, from which it was reasonable to suppose that they were derived: I have very little doubt that some species of them would thrive in the open air in England. On Gordon's Nob I met with them at an elevation of about 4000 feet, but quite dwarfs, bent with the wind and hung with Lichens: this was the kind with the smallest leaf. It is not very common to meet with the seed, but I have seen it: it is a triangular nut, very much like Beech-mast, but much smaller. Some of the Alpine Veronicas would also, I have very little doubt, succeed in the open air in England: these are exceedingly pretty little plants. In the manner of their growth and the arrangement of their leaves and flowers, they are very symmetrical. One of them, which I sent to you, I found in flower on the 1st of October, at an elevation of about 2000 feet, where it must have been exposed even at that period of the year to occasional sharp frosts.

The botany of the eastern and western sides of this island will be found, I fancy, to differ very much. The great primitive range of the

* *Podocarpus ferruginea*, Don. † *Nesodaphne Tawa*, H.f.

island runs down its western side: the highest mountains are here,—the oldest, geologically speaking,—granites, porphyries, crystalline limestones. These form a stupendous mountain-chain, capped with perpetual snow, which catches the westerly wind sweeping across the Southern Ocean, and causes a precipitation of the moisture with which it is charged. The west coast is accordingly extremely humid: this is the character of the country which lies to the west of Blind Bay. On the eastern side of Blind Bay we have a different country,—different, geologically speaking, and different in point of climate. The mountain-range which bounds the Waimea to the east and runs inland towards the sources of the Wairau River, consists of schistose rocks and slates, broken through however in several places by dykes and masses of igneous rocks, hornblende, and basalt. The mountain from which I got many of the plants I sent to you, Gordon's Nob, consists of roofing-slate, set nearly upon its edge. Its summit is almost destitute of vegetation; the vertical strata cropping up through large fields of slate-fragments of all sizes, upon which almost the only thing growing was the *Euphrasia*,* with here and there a dense globular patch of the *Raoulia*, studded over with its starry white flowers. I found here also the Cruciferous plant which you mention as new, and remark as an only specimen.† I looked anxiously for another, but it was the only one I could find.

The mountain-range east of the Waimea is divided by the long valley of the Wairau, from another range to the east of that valley, of a more recent geological character: the rocks of which it consists are sandstones, conglomerates, and non-crystalline limestones; and, as showing the connection between soil and the character of the vegetation, while on the west of the Wairau River the mountains bounding the valley are clothed with Fern and Forest, and offer no pasture, those on the eastern side, to which I have just referred, are almost uniformly grassy; this may in fact be said to be the northern limit of the grassy country which stretches down along the eastern coast of the Middle Island as far as Foveaux Straits. This country, though the hilly portion of it is extremely rugged, is nevertheless traversable, the vegetation opposing very little impediment to moving about; but in most other parts of New Zealand locomotion is a very serious matter whenever you leave a beaten path; for not only are the hill-sides very steep

* *E. cuneata*, Forst.? † *Thlaspi? australe*, H.f.

and much broken up, but the ordinary Fern which clothes them is so high and unyielding as to oppose an almost insurmountable obstacle. It is not more than about fifteen miles in a direct line from my house in the Waimea to the Wairau valley, but the difficulty of crossing the mountain-range, from the causes adverted to, is so great, that the persons who have accomplished it have had four days of most laborious work, and every one bound for the Wairau goes round a distance of about seventy miles rather than face these fifteen miles over the mountains. I will take notice of what you say about seeds of trees and shrubs, and will endeavour to send you some. I shall particularly endeavour to get some of the seed of the Beeches which are found at the highest levels; they are, when well grown, very handsome trees, and would be a great addition to an English arboretum. I sent you in a letter, two years ago, the seed of the large *Carmichaelia*, but I presume it had lost its vitality by the time it reached you. I raised some young plants in my garden here, and I observed that they showed at first true leaves, small and set at considerable distances along the stem, but either the soil or the situation did not suit them, and they died off.

Gardening in this climate would be very satisfactory if we only could get labour; but we cannot, and therein is the great grievance of every New Zealand capitalist at present. Wages are high, but the farmers would not object to pay the wages if they could get hands. In the Blind Bay district we have as much sun perhaps as in any part of New Zealand. The summer temperature is not high, the thermometer seldom passing 80°, the temperature reduced by an almost constant breeze from either the sea or the land; and yet judged by its results in ripening fruits, the climate should be almost equivalent to the south of France, where the temperature is sometimes for weeks together between 90° and 100°. We have Peaches, of very good quality, upon standards in great abundance. Figs of excellent quality; and grapes upon a wall ripen perfectly, or in any sheltered situations where the sweep of the breeze is broken. Melons ripen well without any artificial heat. Pomegranates do not ripen; and I have not heard of any one yet trying the Orange, but it is unlikely that any but the hardiest sorts would ripen, and those only against a wall.

Extracts from Two Letters from the Rev. CHARLES PARISH, *of Moulmein, to* Dr. T. THOMSON, Director of the East India Company's Botanic Garden, Calcutta.

Moulmein, July 30, 1855.

Without much pretension to a knowledge of botany, I am passionately fond of this study, and therefore gladly answer your kind communication and offer of correspondence. You ask about the mountain called Moolee-it, and its productions and elevation, etc. I did not myself ascend it; but, in January last, the Deputy Commissioner of this district invited me to join him in a tour in the neighbourhood; as he is an enthusiastic ornithologist, I thought that our pursuits were of a kindred nature, and gladly availed myself of the proposal.

We went up to the head of one of the four rivers, which unite their waters at Moulmein, the Gyeen, bearing away to the north-east, towards a fine range of mountains, clearly visible on a fair day from this place. After leaving our boats, it took us however three days to reach the foot of them! By this time I was reluctantly obliged to retrace my way alone, as my duties would not allow of a longer absence. We guessed the height of the range to be 6000 feet. Captain Tickell, the Deputy Commissioner, was not desirous of climbing those mountains alone, so he came back, and then pursued an easterly course up another river, the Honarees, and it was in that direction, due east of Moulmein, that he came to the mountain called Moolee-it, which he ascended, and, by the boiling-water test, ascertained its elevation to be 7000 feet. He tells me that he sent his calculations to Captain Thuiller, at Calcutta, for correction; so that you can easily satisfy yourself on this point. Captain Tickell is not a botanist, but he kindly complied with my request that he would bring me Ferns, or other remarkable plants, and I send you some small Ferns which he gathered at random, on a height of between 5000 and 6000 feet; also some interesting Mosses, especially beautiful specimens of *Schlotheimia sulcata*, in fructification. Was it ever found before in that state? The mountain, so far as I can gather from Captain Tickell's description, is clothed with dense jungle to within five hundred feet of the top, where there is a small terrace, just below the loftiest rocky peak, of grass-land, open, and resembling an English heath or moor, with the additional similitude of partridges running about in great numbers among the abundant Fern, which

latter is a *Pteris*, very like our common Brake, *P. aquilina.* Captain Tickell brought down specimens of it; also of what he calls a *Rhododendron*, which he describes as a beautiful shrub, in full flower. He kindly made a sketch of it; but, as the details are not botanically accurate, I cannot decide this point, but hope to do so, if I can succeed in preserving a growing plant of it, which however looks very poorly. The leaves resemble those of a *Rhododendron.* There are no Pines on the mountain. The temperature was not low; it was 50° on the summit, at seven A.M., in January; and as to the statement that Pines do not grow on Moolee-it, I can only say that the mountains near Tounghoo, about two hundred miles to the north, are covered with a species of which I have received branches and cones, gathered at an altitude of 8000 feet, and which prove to be those of *P. longifolia.*

I deeply regretted my inability to accompany Captain Tickell to Moolee-it, which, in very clear weather, may be descried from hence, and is about seventy or eighty miles distant. It is very inaccessible; there are no roads or inhabitants in that part of the country. Captain Tickell of course commanded the services of the Burmese wherever he went, taking them from the nearest villages, and making them show him the way: he had as many as a hundred men with him, and eight elephants. Night after night he and his party encamped in the jungle. The ascent was extremely difficult, and the whole expedition one which a naturalist alone would have undertaken. What a pity that I could not go with him, and that my friend has no knowledge of botany! Never did I regret anything so much in all my life. I am never likely to be able to command the necessary means for such a tour, even if I had the time to devote to it. Possibly Captain Tickell may go again, and I may be so fortunate as to accompany him, at least for a few days, next season; if I do, you may depend on my making good use of my time. Ferns and Mosses are my favourite plants, and I know but little of other kinds; still my ignorance shall not prevent my collecting everything I can find.

At Mergui I gathered a splendid *Platycerium*, neither *P. alcicorne* nor *P. grande:* is it new?* Do you know of any species still larger and finer than the latter? If not, I have one incomparably excelling it; it has a crown, and sessile fronds, two feet across and two feet high, and pendent fronds three feet long and repeatedly dichotomous; fruc-

* In all probability *Platycerium biforme.*

tification a half-cup and pedicelled. If I go to the south again, in two or three months, I will secure specimens, which I shall be happy to send you; kindly tell me the best means of doing so. I am most anxious to know if this noble Fern is an undescribed species. When you have leisure to attend to them, I should like to trouble you with some Ferns, Mosses, and *Jungermanniæ*.

There is a wonderful field open to discovery in this neighbourhood; but I am unfortunately so tied by my duties that I cannot collect and explore as I should like; a week or ten days is the utmost I can ever command, and this is tantalizing, for the distances are great and the difficulties of travelling extreme.

August 31, 1855.

I have the pleasure to enclose a rather better sketch of the *Platycecerium* than I sent before; it conveys a tolerably correct idea of the Fern, which is a truly magnificent species. If I go to Mergui, as I hope, in October, I will get more specimens, for I know its precise locality, on an aged veteran of a *Lagerstrœmia*, a sight of itself, and which is rendered strikingly beautiful by the numerous (twenty or thirty) plants of this Fern which festoon it with their long, pendent, and graceful fronds. But if I send you two growing specimens, it will be as much as I can compass, for they are of no small size or light weight, and, when accompanied by the bough to which they are attached, each is a man's burden. How to dry specimens of it for the herbarium is quite a problem to me; its fronds are like leathern thongs, and the cup which bears the sorus is as stiff as a leathern drinking-cup.

I have carefully examined the drawing of the plant from Mooree-it, and am convinced it is a true and very beautiful *Rhododendron*. The petals are pale rose-coloured, and the entire flower measures nearly four inches across: it is said to be a large shrub. My own specimen looks very sickly, and will not, I fear, bear the climate here. The seeds must have been ripe when Captain Tickell drew it, for he represents the split capsules, but he unfortunately collected none.

Some time ago I gathered a beautiful Orchideous plant, with pink-flowered spikes, something like a Hyacinth; it grows on rocks about twenty miles from hence. The specimens I brought home are flourishing with me, and I would gladly send them, if you think the species is

likely to be new. I found also a fine *Melastoma*, larger-flowered than *M. Malabathrica*, though not so handsome in its form and general aspect.

If I could have a list of all the known East Indian Ferns, it would be a great help to me in collecting these plants.

BOTANICAL INFORMATION.

The Mammoth Tree.*

At the request of our obliging correspondent, Alex. G. Taylor, Esq., of Monterey, the proprietors of the locality of this now celebrated tree, Messrs. Lapham and Haynes, have sent to us the following "*Description of the Mammoth Tree Grove*," accompanied by a well-executed landscape,† drawn on the spot, and engraved at San Francisco, and which we are sure faithfully represents the remarkable spot. Around the picture are compartments, with separate views of the more remarkable trees of the place.

"This gigantic forest is situated in a small valley at the source of one of the tributaries of the Calaveras River, Calaveras County, California. Arriving at Murphy's by one of the daily line of stages, either from Sacramento City or Stockton, or by the Sonora coach, the traveller finds himself within fifteen miles of this celebrated grove. Here animals or vehicles can be procured at all times, and at reasonable rates. Leaving Murphy's by an excellent carriage-road, and gradually ascending, winding through a splendid forest of pines, cedars, and firs, with occasional

* We will not offend our American friends by giving here the botanical name of the tree. It is unworthy a great nation to suppose that an eminent botanist, who first distinguishes the true characters of a new plant, is not entitled to give it what name he pleases, provided he infringes no botanical rule,—of a tree too, unquestionably first brought into scientific notice by an English traveller.—Ed.

† This interesting lithograph-plate is placed in the Museum of the Royal Gardens of Kew. The roller about which the print was wound is made of the wood of the tree, and is also deposited in the Museum. It is not a hard wood, and it has no fragrance, otherwise it much resembles the cedar-pencil wood (*Juniperus Virginiana*). Still more recently we have received fresh seeds from Fras. Hobler, Esq., procured by his brother, George Hobler, Esq., in California; and seeds and cones and specimens of the branches, and a plank of the wood, from Dr. Torrey, collected by Dr. J. M. Bigelow in one of the Pacific Railroad Surveys ordered by the United States Government.—Ed.

oaks, often catching a glimpse of the adjacent pine-clad mountains, the Mammoth Tree Hotel is reached in two and a half or three hours. Here the proprietors, Messrs. Lapham and Haynes, offer every accommodation to parties, visitors, or boarders, at reasonable charges, it being their aim to make the Grove a fashionable and popular place of resort. The valley in which these trees are found contains about one hundred and sixty acres of land, and it is estimated to be four thousand feet above the level of the sea. The distance from Sacramento City by the stage-route is ninety-five miles, and from Stockton eighty-five miles.

"Ninety-two trees of this species are now standing, and are all found within an area of fifty acres of the valley. They are evidently a gigantic species of Cedar, as is indicated by the growth, bark, and leaf; according to botanists however they belong to the family of *Taxodiums*, and have been justly named *Washingtonia gigantea*, and are beyond doubt the most stupendous vegetable products upon earth. They were discovered early in 1850 by hunters, whose accounts were considered fabulous until confirmed by actual measurement.

"Wm. W. Lapham, one of the present proprietors, located and settled here in July, 1853.* The valley enjoys a delightful climate during the summer months, entirely free from the scorching heats of the lower country, the vegetation remaining fresh and green, while the water is a perfect luxury, pure as crystal, and almost as cold as ice. The vicinity offers every inducement to sportsmen: all kinds of game common to the country abound, while the adjacent streams afford excellent trout-fishing. Delightful horseback or buggy rides conduct the visitor to many interesting points of scenery or objects of curiosity, among which may be mentioned the Falls of the San Antone, and the Basaltic Cliff on the North Fork of the Stanislaus River.

"1. Adjoining the hotel, with which it is connected by a floor, stands the stump of the big tree, covered by a rustic arbour; it measures 96 feet in circumference and is 7 feet high. A section of two feet was taken from this stump, also a section of bark 50 feet long, by Capt. Hanford, and carried to New York for exhibition; they are now in Paris. The surface of the stump is smooth, and affords ample space for thirty-two persons to dance, it being 75 feet in circumference, solid

* In the same year, and, it would appear, nearly at the same time, Mr. Wm. Lobb collected copious seeds and specimens. As soon as possible thereafter he returned to England with his treasures; and the discovery and particulars of the tree were given by Dr. Lindley in the 'Gardeners' Chronicle' for December of the same year.—Ed.

timber; theatrical performances have also been given upon it by the 'Chapman Family' in May, 1855, also the 'Robinson Family,' July 4, 1855. This monster tree was cut down by boring with augers, and sawing the spaces between: it required the labour of five men twenty-five days to effect its fall, the tree standing so nearly perpendicular that a wedge and battering-ram were necessary to cause its fall after being fully cut off.

"2. Adjoining the stump lies a section of the trunk; this is 25 feet in diameter and 20 feet long; beyond lies the immense trunk, as it fell, measuring 302 feet from the base of the stump to its extremity: upon this is situated the bar-room and Ten-Pin Alley, stretching along its upper surface for a distance of 81 feet, affording ample space for two alley-beds side by side.

"3. Leaving the hotel, let us walk into the forest by the upper trail, or we can ride (for the road has been opened so as to permit any vehicle to pass): we are at once struck with astonishment at the magnitude of the trees, and, passing several immense ones, we reach the 'Miners' Cabin'; this tree measures 80 feet in circumference, and is about 300 feet in height; the 'Cabin,' or burnt cavity, measures 17 feet across its entrance, and extends upward of 40 feet.

"4. Continuing our ramble, admiring the luxuriant growth of underbrush, consisting of young firs, cedars, dogwood, and hazel, we reach the 'Three Graces'; these splendid trees evidently grow from one root, and are the most beautiful group in the forest; towering side by side to the height of 290 feet, tapering symmetrically from their base upward, their united circumference amounts to 92 feet: it is 200 feet to the first limb on the middle tree.

"5. The 'Pioneers' Cabin' is the next tree that arrests our attention, rising to the height of 150 feet, the top having been broken off; this tree measures 33 feet in diameter.

"6. Continuing our walk, we reach a forlorn-looking tree, having many rents in his bark, and withal the most seedy-looking individual in the forest; this is the 'Old Bachelor;' he is about 300 feet high and 60 feet in circumference.

"7. The next tree is the 'Mother of the Forest;'* this magnificent tree rises to the height of 327 feet and is 90 feet in circumference.

* The view of this tree leaves an unfavourable impression on the mind; for, still standing (and for the present living), it is denuded of its bark for 120 feet from the base: around this portion is a scaffold and a zigzag staircase.—Ed.

The scaffolding by which the bark was reached and taken off is also seen in the view. This tree was stripped of its bark to the height of 120 feet, in the spring of 1854, by Mr. George Gale, requiring the labour of five men ninety days; during this time a person fell from the staging 100 feet, but fortunately escaped with a broken limb. The tree is still green and flourishing, showing no signs of decay.

"8. We are now amidst the 'Family Group,' and standing near the uprooted base of the 'Father of the Forest;' the scene is grand and beautiful beyond description; the venerable 'Father' has long since bowed his head in the dust, yet how stupendous even in his ruin! he measures 112 feet in circumference at the base, and can be traced 300 feet, where the trunk was broken by falling against another tree; it here measures 18 feet in diameter, and according to the average taper of the other trees, this venerable giant must have been 450 feet in height when standing. A hollow chamber, or burnt cavity, extends through the trunk 200 feet, large enough for a person to ride through; near its base a never-failing spring of water is found; walking upon the trunk, and looking from its uprooted base, the mind can scarcely conceive its prodigious dimensions! while on either hand tower his giant sons and daughters, forming the most impressive scene in the forest.

"9. Passing onward, we reach the 'Husband and Wife,' leaning affectionately toward one another; they are each 60 feet in circumference and 250 feet in height.

"10. 'Hercules,' one of the most gigantic trees in the whole forest, stands leaning in our path; this tree, like many others, has been burned at the base; it is 325 feet high and is 97 feet in circumference. This specimen would make 72,500 feet of lumber: upon the burnt space near the base is the inscription 'J. M. Wooster, Ju. 1850,' supposed to have been made by the discoverer of the grove.

"11. The 'Hermit,' standing solitary and alone, is next observed; this tree, straight and well-proportioned, measures 320 feet high and 60 feet in circumference.

"12. Still returning towards the hotel by the lower trail, we pass the 'Mother and Son,' which together measure 93 feet in circumference; the 'Mother' is 320, the 'Son' a hopeful youth of 300 feet.

"13. The 'Siamese Twins and Guardian' form the next group; the 'Twins' have one trunk at the base, separating at the height of 40 feet, each measuring 300 feet high; the 'Guardian' is 80 feet in circumference and is 325 feet high.

"14. Beyond stands the 'Old Maid,' slightly bowing in her lonely grief; she measures 60 feet in circumference and is 260 feet high.

"15. Two beautiful trees, called 'Addie and Mary,' are the next to arrest our attention, measuring each 65 feet in circumference and nearly 300 feet high.

"16. The 'Horseback Ride' we reach next; this is an old, fallen trunk of 150 feet in length, hollowed out by the fires which have, in days gone by, raged through the forest; the cavity is 12 feet in the clear, in the narrowest place, and a person can ride through, on horseback, a distance of 75 feet. Passing onwards we observe several Yew-trees; from this timber the Indians construct their bows, it being exceedingly close-grained and elastic.

"17. 'Uncle Tom's Cabin' next claims our admiration; this tree is over 300 feet high and is 75 feet in circumference. The 'Cabin' has a narrow burnt entrance of 2½ feet in diameter; inside, the cavity is large enough to seat fifteen persons.

"18. Two other trees next attract our gaze, one of which, named the 'Pride of the Forest,' noted for the smoothness of its bark, measuring 280 feet in height and 60 feet in circumference.

"19. The "Burnt Cave' is also a remarkable feature in the forest; it measures 40 feet 9 inches across its roots, while the cavity extends to the distance of 40 feet, large enough for a horseman to ride in, and, turning around, return.

"20. We now reach the 'Beauty of the Forest' [seen in view a little to the right of the Ten-Pin Alley]; this beautiful tree is 65 feet in circumference, and full 300 feet high, symmetrical in its form, and adorned with a magnificent crest of foliage.

"21. Reaching the road, and returning to the house, we pass the 'Two Guardsmen' (two large trees to the right in centre view); the new road to the hotel will pass between these majestic sentinels, which tower to the height of 300 feet, and are 65 and 70 feet in circumference, forming an appropriate gateway to this wonderful forest.

"Much more might be said in relation to the forest and surrounding country, but with the present and continually-improving facilities of travelling, let every person who wishes to spend a few days or weeks pleasantly and with profit, examine for themselves the 'Mammoth-Tree Grove.'"

Plants of M. BOURGEAU, *collected in* Teneriffe.

This excellent and indefatigable Collector has again safely returned to Paris, after a spring and summer devoted to botanical researches in the Canary Islands. Besides a beautiful *suite* of samples of the woods of Teneriffe and living succulent plants (chiefly *Crassulaceæ*), and cuttings from the celebrated Dragon-tree of Orotava, for the Royal Gardens of Kew, M. Bourgeau has brought home a noble harvest of dried specimens. In forming this collection he has neglected all the well-known European plants, and has gathered, of the more interesting, sixty sets of 390 species, for which there are already fifty subscribers. Those who know the beauty and perfection of M. Bourgeau's specimens, and the very moderate price (30 francs the century), will not delay procuring them. Letters may be addressed to M. Bourgeau, 14, Rue St. Claude-au-Marais, Paris.

The late Mr. David Douglas.

We were glad to read in a Californian newspaper, of the present year, the following intelligence from Hawaii, in the Sandwich Islands:—

"On a reçu de San Francisco un monument en marbre blanc, érigé par M. Julius L. Brenchley à la mémoire d'un illustre voyageur, l'infortuné David Douglas, qui mourut en 1834 au pied du Maunakea, dans l'île de Havaii, assassiné, suivant les uns, par un convict échappé de Botany Bay; massacré, suivant les autres, par un bœuf sauvage et furieux. Ce monument, qui fait honneur au patriotisme et à la générosité dont M. Brenchley a laissé tant de traces dans nos îles, porte l'inscription suivante:—

Hîc jacet
D. DAVID DOUGLAS,
Scotiâ, anno 1799, natus;
Qui,
Indefessus viator,
A Londinensi Regiâ Societate Horticulturali missus,
In Havaii saltibus
Die 12ª Julii, A.D. 1834,
Victima scientiæ
Interiit.

'Sunt lacrymæ rerum et mentem mortalia tangunt.'—VIRG.

"Douglas est enterré dans le Cimetière de la grande église à Ho-

nolulu. Sa tombe, qui était confondue avec celles de kanaks obscurs, va recevoir enfin une distinction méritée et trop longtemps attendue."

Mr. Veitch.

Few men have done more to serve the cause of botany and horticulture, by the quantity of new or rare and beautiful plants introduced to our gardens and stoves and greenhouses, than Mr. Veitch, of the Exotic Nurseries of Exeter and Chelsea; plants too from various regions of the globe, collected by travellers that he has sent out at great expense, and through a long series of years,—chiefly by two brothers, the Messrs. Lobb. The researches of one, William Lobb, have extended, in the New World, from the extreme south in Patagonia and Chili to the Oregon country in the north; while those of Thomas Lobb, in the Old World, have been over a great part of the Continent of India, from east to west, and north from Himalaya to the Malay Islands, Java, Borneo, etc. We are glad to find that such services on the part of Mr. Veitch have been appreciated at the late great Exhibition at Paris, and that a silver medal has been awarded to him, not as an exhibitor, but as a co-operator, in furthering the cause of science; and no man could deserve it better. That his son in the firm, Mr. James Veitch, jun. (the firm is James Veitch and Son), could not be included in the award, is simply owing to his having been engaged a less period of time in their extensive concerns.

NOTICES OF BOOKS.

Géographie Botanique Raisonnée, *ou Exposition des Faits principaux et des Lois concernant la Distribution Géographique des Plantes de l'époque actuelle; par* M. Alph. de Candolle. 2 vols. 8vo. Paris.

(*Continued from p.* 88.)

The 9*th Chapter* is devoted to a series of discussions upon the native countries of the majority of cultivated plants, and is full of curious matter, the fruit of careful research. It is divided into two Sections, whose titles appear paradoxical at first sight, being (1) species culti-

vated intentionally (*volontairement*), and (2) those that are cultivated in opposition to the wishes of man, those plants, namely, which intrude themselves amongst those cultivated by man, and which are found nowhere else. The latter subject is dismissed in a very few sentences, the plants alluded to having been previously enumerated under the head of naturalized species. The subject is however, we think, capable of much fuller elucidation than it has yet received, and is a very curious and interesting one.

Under the head of History and Origin of Cultivated Plants, M. de Candolle arranges the latter according to the organs for which they are cultivated, as for their roots, bulbs and tubers, stems, leaves, flowers or bracts, fruits, and seeds; to this list might have been added those cultivated in tropical countries especially, for the beauty or odour of their flowers, as various *Hibisci*, the *Nyctanthes Arbor-tristis*, and Horse Chestnut, of which the origin is supposed to be unknown, but of which some, at any rate, may be traced to known wild species, of which they appear to be varieties induced by cultivation.

Following the discussions on the origin of the cultivated species, are tabulated results, in which the species treated of are arranged according to the following classes:—

1. Those found absolutely wild, and about whose specific identity there need be no question. (85 species.)

Solanum tuberosum, *L.*
Dioscorea pentaphylla, *L.*
,, bulbifera, *L.*
,, aculeata, *L.*
,, deltoidea, *Wall.*
Ipomœa mammosa, *Choisy.*
Brassica campestris, *L.* (*et* B. Rapa).
,, Napus, *L.*
,, oleracea, *L.*
Raphanus sativus, *L.*
Daucus Carota, *L.*
Pastinaca sativa, *L.*
Campanula Rapunculus, *L.*
Allium sativum, *L.*
Rubia tinctorum, *L.*
Cannabis sativa, *L.*
Medicago sativa, *L.*
Onobrychis sativa, *Lam.*
Trifolium pratense, *L.*
Cichorium Intybus, *L.*
,, Endivia, *L.*
Rumex Patientia, *L.*
,, Acetosa, *L.*
Allium Cepa, *L.*
Thea Chinensis, *Lour.*
Ilex Paraguayensis, *St.Hil.*
Indigofera argentea, *L.*
Erythroxylon Coca, *Lam.*
Morus alba, *L.*
,, nigra, *L.*
Humulus Lupulus, *L.*
Crocus sativus, *L.*
Anona squamosa, *L.*
,, muricata, *L.*
,, reticulata, *L.*
Citrus medica, *Gall.*
,, Limonum, *Gall.*
Garcinia Mangostana, *L.*
Mammea Americana, *L.*
Vitis vinifera, *L.*
Anacardium occidentale, *L.*
Fragaria vesca, *L.*
Rubus Idæus, *L.*
Prunus Avium, *L.*
,, Cerasus, *L.*
,, domestica, *L.*
,, insititia, *L.*
Prunus Armeniaca, *L.*
Amygdalus communis, *L.*
Pyrus communis, *L.*
,, Malus, *L.*
Cydonia vulgaris, *L.*
Punica Granatum, *L.*

Jambosa Malaccensis, *Wight et Arn.*
Lagenaria vulgaris, *Ser.*
Cucurbita ovifera, *L.*
Cucumis Melo, *L.*
Ribes rubrum, *L.*
Olea Europæa, *L.*
Lucuma mammosa, *Gærtn.*
Sapota Achras, *Mill.*
Persea gratissima, *Gærtn.*
Papaya vulgaris, *DC.*
Phœnix dactylifera, *L.*
Musa sapientum, *Br.*
Bromelia Ananas, *L.*
Triticum vulgare, *L.*
,, Spelta, *L.*
Hordeum distichum, *L.*
Oryza sativa, *L.*
Polygonum Tataricum, *L.*
Lupinus albus, *L.*
,, Termis, *L.*
,, hirsutus, *L.*
Pisum arvense, *L.*
Pisum sativum, *L.*
Lathyrus sativus, *L.*
,, Cicera, *L.*
Vicia sativa, *L.*
Camelina sativa, *Crantz.*
Juglans regia, *L.*
Theobroma Cacao, *L.*
Cocos nucifera, *L.*
Coffea Arabica, *L.*
Gossypium punctatum, *Sch. et Th.*

2. Those found apparently wild, but not certainly so, being perhaps naturalized escapes from cultivation, but all retaining the appearance of the same plant in its cultivated state. (21 species.)

Arum Colocasia, *L.*
Linum usitatissimum, *L.*
Morus Indica, *Willd.*
Spinacia oleracea, *L.*
Indigofera tinctoria, *L.*
Citrus Aurantium, *Risso.*
,, Javanica, *Blume.*
Persica vulgaris, *Mill.*
Psidium Guajava, *Raddi.*
Artocarpus integrifolia, *L.*
Avena sativa, *L.*
Triticum monococcum, *L.*
Secale cereale, *L.*
Polygonum Fagopyrum, *L.*
,, emarginatum, *Roth.*
Faba vulgaris, *Mœnch.*
Ervum Lens, *L.*
Cicer arietinum, *L.*
Sesamum orientale, *L.*
Papaver somniferum, *L.*
Gossypium herbaceum, *L.*

3. Those found certainly wild, but which, not exactly resembling the cultivated forms, are open to doubts. (6 species.)

Beta vulgaris, *Moq.*
Lactuca Scariola sativa.
Allium Porrum, *L.* (under the form of A. Ampeloprasum).
Mangifera Indica, *L.*
Ribes Grossularia, *L.* (under the form of R. Uva-crispa).
Gossypium arboreum, *L.*

4. Doubtful as wild, and also as to their specific identity with the cultivated plants. (5 species.)

Manihot utilissima, *Pohl.*
,, Aipi, *Pohl.*
Ficus Carica, *L.*, and allied species.
Hordeum vulgare, *L.*
Zea Mays, *L.*

5. Unknown in a native state, and undoubtedly distinct from any known wild plant. (32 species.)

Dioscorea alata, *L.*
Batatas edulis, *Choisy.*
Helianthus tuberosus, *L.*
Arracacha esculenta, *Banc.*
Agave Americana, *L.*
Saccharum officinarum, *L.*
,, violaceum, *Juss.*
,, Sinense, *Roxb.*
Nicotiana Tabacum, *L.*
,, rustica, *L.*
,, Chinensis, *Fisch.*
,, Persica, *Lindl.*

Caryophyllus aromaticus, *L.*
Anona Cherimolia, *Lam.*
Citrus vulgaris, *Risso* (C. Aurantium amarus).
Citrus Japonica, *Thunb.*
Eriobotrya Japonica, *Lindl.*
Jambosa vulgaris, *DC.*
Cucurbita maxima, *Duch.*
Cucumis Citrullus, *L.*
„ sativus, *L.*
Chrysophyllum Cainito, *L.*
Solanum esculentum, *Mill.*
Lycopersicum esculentum, *Mill.*
Artocarpus incisa, *L. f.*
Triticum turgidum, *L.*
Hordeum hexastichon, *L.*
Avena orientalis, *Shreb.*
Phaseolus vulgaris, *L.*
Chenopodium Quinoa, *Willd.*
Arachis hypogæa, *L.*
Gossypium Barbadense.

6. Those that are unknown in a wild state, but which are perhaps only cultivated varieties of known wild species. (6 species.)

Arum esculentum, *Forst.*
Citrus Decumana, *Willd.*
Allium Ascalonicum, *L.*
Persica lævis, *Mill.* (var.? P. vulgaris).
Cucurbita Melopepo, *L.*
Avena nuda, *L.*

7. Those that are unknown in a wild state, but are equally doubtful as species :—

Indigofera Anil, *L.*
Cucurbita Pepo, *Duch.*

Milium, Sorghum, Phaseolus, Dolichos, Capsicum, } Various forms.

Upon the whole this extremely difficult subject is treated throughout with considerable skill and great learning. Absolute data are however wanting for ascertaining the origin of many, and especially of locally cultivated species; and we fear that we should have reduced the first class and enlarged the second.

This subject naturally leads to another still more embarrassing,—the original countries of the cultivated species. By far the greater majority are assigned to the Old World: 35 to Europe, 33 to Northern and Western Asia, 1 (Date) to North Africa, 3 (one kind of Indigo, Coffee, and one kind of Cotton) to Tropical Africa, 40 to Southern Asia and the Malay Archipelago; none to South Africa or Australia or New Zealand, and a few are doubtful; 33 are assigned to America. One only (*Cucurbita Melopepo*, L.) is wholly unknown, and considered as probably a cultivated race of some existing wild species.

The most striking result, as it appears to M. de Candolle, to be derived from the above inquiry, is the great antiquity of the majority of the cultivated varieties or races. In the sixteenth century the principal kinds of Cabbage, Turnip, and Gourds were known; besides cereals and fruit-trees, whose identity with those now cultivated is less

evident. The Romans, in the days of Pliny, cultivated many varieties of Pears and Plums. Homer distinguished Poppies with black and white seeds. The Egyptians cultivated white-seeded *Sesamum*. The Hebrews distinguished the sweet and bitter Almond; and the black and white Grape appear to be of great antiquity. Hence it appears that perhaps too much influence is attributed to cultivation, which effects many small changes, whilst truly hereditary races are always very ancient; that is to say, they date from a period that is altogether prehistoric, if indeed they are not older than the art of cultivation.

What appears equally curious is, that certain cultivated plants which are so closely allied that it is doubtful whether they are species or varieties, as the two Guavas, *Psidium pomiferum* and *pyriferum*, the sweet and bitter Orange, the Peach, and Nectarine, are also of very considerable antiquity.

Chapter 10 is devoted to the study of what M. de Candolle calls "Espèces disjointes," or species whose individuals are disconnected by large expanses of land or water, but which cannot have been transported from one country to the other on account of the size or structure of their seeds, or of some obstacle presented by their habits of life. These come under three principal categories:—1. Woody plants with bulky seeds, that are not littoral; 2. Fresh-water plants; and 3. Mountain plants.

The facts here adduced are very numerous, well arranged, and some of them most curious; and though very often discussed, have hitherto met with no plausible explanation; perhaps the most striking are, that of *Eriocaulon septangulare*, which is confined in the Old World to a very few spots in the extreme west of Ireland and Scotland, but which is common in North America from Newfoundland to the Saskatchawan River;—*Phryma leptostachya*, L.,* a native of the mountains of Nepal and the United States of America;—and *Spiranthes cernua*, Rich., found in one spot in the south of Ireland and in the Northern United States and Canada, etc. With regard to the *Phryma*, M. de Candolle inclines to the hypothesis of a double creation, whilst he thinks the *Eriocaulon* may have been transported at a remote period, when the plant had a

* The *Phryma* however is much less local than M. de Candolle supposes. In the Himalaya it ranges from Kumaon to the confines of Bhotan, and also occurs in the Khasia Mountains: of the countries between these last and the east coast of Asia absolutely nothing is known. *Phryma* is an extremely difficult plant to find in the woods it inhabits, and may be much more common than is usually supposed.

wider range in America, and when the oceanic currents between Canada and Scotland were stronger and more direct.

Under the head of tropical disconnected (*disjointes*) species a list of a considerable number is given, with the caution that many may be considered as naturalized. About 50 however remain as most unlikely to have been transported by causes now in operation, and the majority, without being truly aquatic, inhabit moist places. It appears proved to M. de Candolle that the "disconnected species" are much less numerous in the tropics than in the northern extra-tropical regions;* and upon the whole the study of the tropical species leads M. de Candolle to the same general conclusion as that of the extra-tropical did, viz. that in the present state of our knowledge there appears to be no direct solution of the problem of their dispersion.

Chapter 11. On the early condition and probable origin of existing Species in a state of Nature.—Under the first division of this subject M. de Candolle declares the impossibility of explaining many facts, from a study of the species themselves in relation to the existing condition of things on the earth's surface. He observes that in numerous cases he has been obliged to own that existing causes are insufficient to explain well-established facts in distribution, and that the true but anterior causes must be sought in different conditions of different areas on the globe, in different states of species, or in a different distribution of land and sea, in changes of climate, and in different means of transport.

The facts that have led to this conclusion are:—

1. Certain species are wanting in regions so well adapted to their existence, that when once artificially introduced there, they forthwith establish themselves like natives of the country.

2. Woody plants flourish in mass in countries where the same species cannot re-establish themselves after they have been once removed.

3. Species with large seeds grow in countries between which there are insuperable obstacles to their seeds having been transported.

4. Many species are common to the tops of very distant mountains, between which an interchange of seeds seems to be inconceivable.

5. With regard to widely distributed aquatic, etc. plants, many

* A conclusion the accuracy of which we extremely doubt, for reasons stated in a note to page 62. That there are however fewer disconnected species in proportion to the whole tropical than temperate flora, is most likely the case.

have seeds that only ripen under water and sink; others have seeds that present no facilities for transport by winds, cannot have been introduced by man, and will not endure exposure to salt-water.*

6. Certain countries, separated by wide expanses of ocean, have more species in common than either the distance or nature of these climates would render probable under ordinary circumstances; whilst contiguous countries, with similar climates, sometimes present very different species.

7. Some countries are remarkable for the great number of species they contain in a small area, others for comparative poverty.

8. Species of simple structure have often wide ranges, though their seeds are not well adapted for transport; on the other hand, many species, whose seeds appear perfectly adapted to secure a wide distribution, have very narrow ranges.

All these phenomena direct the attention of the inquirer to a different order of things to that now existing; that is, to a former epoch, namely, to the quaternary† period of geologists, if not to a still earlier date in the world's history. Mention is made of the late Professor E. Forbes‡ as the strenuous supporter of this view.

Under the head of proofs of the historical antiquity and indications of the geological antiquity of the greater part of existing species, M. de Candolle boldly states that this can be demonstrated both *à priori* and by some observations of geologists. Under the *à priori*, he alludes

* Mr. Darwin's experiments on the power which seeds have of retaining their vitality when exposed to the effects of salt-water (Gardeners' Chronicle, 1854–5) were of course unknown to M. de Candolle.

† The Post-pleiocene of English geologists, or that immediately preceding the present.

‡ M. de Candolle mentions the opinions of Forbes, given in his well-known Essay, as ingenious hypotheses concerning one region of the globe only, and applicable only to a part of the phenomena to which his book is devoted; and he professes to take a more general view, to examine the foundations of the hypothesis, to discuss its probability, and to compare it with other theories. M. de Candolle here perhaps hardly recognizes sufficiently the real value of Forbes's Essay, and that the evidences of the probable truth of the hypotheses he advocates rest upon geological and zoological facts; for though a vast number of difficult phenomena in the geographical distribution of plants, cited by Forbes, De Candolle, and others, may be explained by the hypothesis, none of these can be said to afford anything approaching to proof of it. Forbes had animals and shells, both in a recent and fossil state, to reason from, occupying in part the areas now occupied by the plants now existing, and in part also ancient rocks, whose geological relations were not only well known, but the theory of whose formation is proved. These points are however fully admitted at the conclusion of the volume.

to the hereditary character of specific forms, as derived from the Egyptian sculptures, adding, that stability (permanence) of form is the hypothesis that must present itself first to any unprejudiced observer, whilst it is for those who demand a constant renewal of forms to prove their position; and as to those geologists who maintain that every well-marked geological epoch has different plants as well as different animals, M. de Candolle thinks that their assumption is too absolute.*

Retaining the proofs of the antiquity of existing species, the weight of the evidence rests, more or less directly, on two main classes of facts: of these, to the first belong the imbedded remains of plants, believed to be specifically identical with existing ones, in bogs and in the sea, whose submersion or imbedding in all cases precedes the historical era, and in some cases, owing to the bulk or character of the superincumbent soil, or to the nature of the animal remains imbedded with them, may fairly be considered as preceding the existing geological condition of the country. Sir Charles Lyell's 'North American Travels' afford M. de Candolle the best cases in point, and his other works many more. A unique case is that of the identification, by M. Brongniart, of the nut of a species of Hickory found in the pleiocene beds of Europe, with that of a North American species. M. de Candolle however adds the caution, that this does not prove specific identity, as the flowers, leaves, etc. of the plants may be different.†

* Upon this point the views of our best English geologists would certainly agree with M. de Candolle's, and we would add that there is still much to be learnt upon this subject from the distribution of plants. The difference between the existing Floras of Europe and Australia is the equivalent of two geological epochs, so distinct that a palæontologist would demand the lapse of an indefinite number of intervening centuries between the times during which each flourished, supposing them to be superimposed, or in close proximity. But though Europe and Asia are not juxtaposed, Australia and New Zealand are, and they present analogous differences, as do South-east and South-west Australia. If allowance is not made by geologists for possible great differences between the inhabitants of adjacent countries, still less is often granted for local distribution. The species and genera of one Flora are so distributed that contiguous spots present different assemblages, and it is these local causes that lead to the imbedding of fossils that also determine the kind of plants to be imbedded. Again, fossils are too often regarded as affording absolute proof ot the character of the Flora to which they belonged, whereas they may be only indications of the prevalence of a species, the genus or order of which is otherwise absent or extremely rare at the same epoch; for instance, it is often the case that one species of Fern is so abundant over an area where Ferns form a small proportion of the Flora, that it would probably be found in every bed of fossils; whilst *Coniferæ*, which form a larger proportion of the Flora of Tasmania than any equivalent area, are so scarce in individuals there that they would appear very rarely amongst other fossil remains.

† This reminds us of a point much insisted upon by Edward Forbes, and which

The second class of facts adduced is the high antiquity of many timber-trees. It is unphilosophical to assume that these aged individuals, which are 3000 years old at a moderate computation, are the parents of their kind; whilst to suppose them even the grandsons of the first parent of the species, is giving the latter a startling antiquity. M. de Candolle does not allude to the argument derived from the known geological antiquity of many animal species, which, though no proof of an equal duration for the life of vegetable species, renders it unphilosophical to deny it; whether we consider plants and animals as parallel series of the great kingdom of organic nature, or the fact of so many animals being dependent upon individual species of plants for their continued existence.

All further inquiry into these subjects is here suddenly suspended, the subject becoming complicated with, or contingent upon, the idea maintained by the inquirer as to the changes that time may or may not have effected upon species. An article is devoted to this, and it opens with the ominous title 'Définition de l'Espèce.' A good *résumé* is here given of all former definitions, together with the arguments for and against every clause in these. It is not our purpose to plunge into this sea of difficulties; it is enough to say that M. de Candolle believes in species as having definite existences, and considers his father's definition, of what they may be supposed to be, almost as good as can be given.

The changes which we ourselves witness are classed under—1. Variations. These are slight changes in individuals or in their parts, depending on varying seasons, climate, exposures, etc., and are of little moment. 2. Monstrosities. These need no definition. 3. Varieties. These involve physiological changes in the individual, which are propagated by division of it (budding, grafting, etc.), but which are lost by seed. 4. Races. These are peculiar states of species, which almost

has not yet been fully appreciated by geologists, which is, that specific identity of fossils in the beds of far distant countries is opposed to these being strictly contemporaneous. (See his Essay on the Indian Fossils, in the Geological Transactions.) There is no doubt but that the pleiocene and existing Floras of Europe would, if fully known, be ranked as belonging to very distinct geological epochs; but yet the pleiocene Flora of Europe may prove similar to the existing Flora of America. Granting such to be the case, how, after several succeeding geological epochs, when perhaps the genus *Juglans* will have disappeared, will it be possible to classify the rocks of Europe and America without confounding the European pleiocene with the now existing Flora of America?

invariably retain their peculiarities from generation to generation, both when propagated by seed and, more markedly still, when increased otherwise). As it is often impossible to tell what should be considered a race, and what a species, the existence of races may perhaps be assumed to present an insuperable obstacle to the determination of the limits of many species. It may take years to prove that a variety is nothing more than a variety; but it is obviously hopeless, in most cases, to expect to prove that a race is only a more permanent kind of variety. Recourse must be had to hybridizing, which however is not now held to be an absolute test. Analogy with other plants must also be appealed to; but the acknowledged fact that characters which are held to be of no more rank than variations in some plants, are of specific value in others, often renders this line of argument useless.

Under the head of changes that may be effected in species by causes protracted through many ages, or many thousands of years preceding the present, the subject of acclimatation is discussed. Acclimatation M. de Candolle holds (with Petit-Thouars and others) to be a chimera; plants either resist the effects of altered conditions and flourish, or succumb under them; they do not change their natures. On the other hand, he admits the existence of wild races of plants just as of cultivated races.

(*To be continued.*)

PIESSE, G. W. SEPTIMUS, Analytical Chemist; *The* ART OF PERFUMERY, *and the methods of obtaining the Odours of Plants; with instructions for the manufacture of Perfumes, etc.* 12mo. London. 1855. With woodcuts.

Among the varied products of vegetables the "*odours*" have been justly and universally celebrated in prose and in verse, and our author introduces, at the opening of his first Chapter, Thomson's well-known and appropriate lines:—

> "By nature's swift and secret working hand
> The garden glows, and fills the liberal air
> With lavish odours.
> There let me draw
> Ethereal soul, there drink reviving gales,
> Profusely breathing from the spicy groves
> And vales of fragrance."

The odours here alluded to are the natural odours of plants. The object of this book is to describe the mode of collecting and preserving these odours, so as to have them always at command, and more, how the odour of one particular plant is to be imitated by the use of other plants and other substances; for instance, that of *Heliotrope* is made, or imitated, by *Almonds* and *Vanilla;* and the *Extrait de Héliotrope*, as sold in the shops of Paris and London, "is really a very nice perfume, passing well with the public for a genuine extract of Heliotrope." Now all this is produced in the laboratory, and for this we are indebted to chemistry; and the history and mystery of the perfumery trade are here candidly laid before the public by one largely engaged in it, and in a way which does him much credit. M. Piesse accounts for the art of perfumery having attained so little distinction in this country by the secrecy that has been so long maintained regarding the various modes of preparation; and he agrees with Professor Solly that "it is a great mistake to think that a successful manufacturer is one who has carefully preserved the secrets of his trade, or that peculiar modes of effecting simple things,—processes unknown in other factories, and mysteries beyond the comprehension of the vulgar,—are in any way essential to skill as a manufacturer, or to success as a trader." Another reason, however, for the art of perfumery having attained so little celebrity among us, is perhaps to be found in the unsuitableness of our climate, to the fully eliminating the odours of many plants. The finest perfumes come from the southern regions. "The south of Europe is the only garden of utility to the perfumer. Grasse and Nice are the principal seats of the art, and, from their geographical position, the grower has at command that change of climate best fitted to bring to perfection the plants required for his trade."

The Preface and the Introductory Section say much in praise of perfumery; and we are assured that in neglecting to tutor the olfactory nerve, we are constantly led to breathe impure air, and thus poison the body by neglecting the warning given at the gate of the lungs. Persons who use perfumes are more sensitive to the presence of a vitiated atmosphere than those who consider the faculty of smelling as an almost useless gift. We certainly know many who consider it anything but a blessing to have the olfactory nerves so sensitive of odours, inasmuch as the less agreeable of these are the most prevalent, especially in cities and great towns: it would be otherwise were delicious odours more widely diffused.

The commercial value of these manufactured odours is exceedingly great: British India and Europe alone consume annually more than 150,000 gallons of perfumed spirits under various titles, such as *Eau de Cologne*, *Essence of Lavender*, *Esprit de Rose*, etc. A single perfumer of Grasse and Paris employs 80,000 lbs. of *Orange-flowers*, 60,000 lbs. of *Acacia* buds (*Acacia Farnesiana*), 54,000 lbs. of *Rose-leaves* (petals), 32,000 lbs. of *Jasmine-flowers*, 32,000 lbs. of *Violets*, 20,000 lbs. of *Tuberose*, 16,000 lbs. of *Lilac*, and still larger quantities of the more common scents, *Rosemary*, *Mint*, *Citron*, *Thyme*, etc. Eighty thousand persons are employed, directly or indirectly, in the South of France in extracting their odours; and tracts of *flower-farms* exist in Turkey, more extensive than the whole of Yorkshire. The various Essential Oils or Ottos, paying one shilling per pound duty, entered for *home* consumption alone, amounted in 1852 to 195,346 lbs.; and the duty, at that low rate, to £9766. 16*s*.

The several processes of *Expression*, *Distillation*, *Maceration*, and *Absorption* are explained, and then our Author proceeds to notice the plants alphabetically, from which the principal simple perfumes are derived. A list may not be unacceptable to our readers. *Allspice*. *Almonds*. *Anise*. *Balm*. *Balsam* (Myroxylon peruiferum and Toluifera Balsamum). *Bay* (*Sweet*). *Bergamot* (from the fruit of Citrus Bergamia). *Benzoin* (Styrax Benzoin), much used for pastilles and for *fictitious* Vanilla pomade. *Caraway*. "*Cascarilla*," this is mentioned as "*Cascarilla gratissima*," and as a Cape plant, together with "*Cascarilla fragrans* and *C. fragilis*," and the bark as used for making pastilles: but there must be some error, *Cascarilla* (meaning 'little bark' in Spanish) is given to very different plants. The Author probably intends *Croton Eleuteria*, but if so it is West Indian, not a Cape plant: and there are *Croton fragrans* and *Croton fragile*, but they are natives of South America. The genus *Cascarilla*, in botany, is confined to a group of plants detached from *Cinchona* (Peruvian Barks). *Cassia* (Cinnamomum Cassia). *Cassie*, flower-buds (or flower-heads) of *Acacia Farnesiana*. M. Piesse properly cautions the inexperienced not to confound *Cassie* with *Cassia*, previously named; the latter should be called *Acacia*. *Cedar-wood;* here we fear M. Piesse's botany is at fault, for he calls it the "*Lebanon Cedar-wood*" (meaning Cedrus Libani), but from his speaking of slips of its wood being used as matches for lighting lamps, and further, in describing in a letter to us the fragrant essential oil of this

wood (accompanying a sample for the Museum) as extracted from the shavings and refuse of "*Cedar-pencils,*" it is clear that the so-called "Virginian Cedar" is intended, viz. *Juniperus Virginiana*. *Cedrat* and *Citron* (Citrus Medica). *Cinnamon* (Cinnamomum verum). *Citronella*, from an *Andropogon*, probably *A. Schœnanthus*. *Cloves*. *Dill* (Anethum graveolens). *Eglantine* (made of half-a-dozen plants,—excluding *Eglantine* or Sweet Briar, for that plant, we are told, does not itself find a place in the perfumer's "scent-room"). *Fennel-Flag* (Acorus Calamus). *Geranium* (chiefly Pelargonium odoratissimum). *Heliotrope* (already noticed). *Honeysuckle*, imitation only. *Hovenia*: a "market-article," made of Rose, Lemon, Clove, etc. *Jasmine*. *Jonquil*. *Laurel*; "from the berries of the *Laurus nobilis* and from the leaves of *Laurus Cerasus*." Now the *Laurus nobilis* is the *Bay* or *Sweet Bay*, already mentioned, and is of the Laurel family, and cannot have any "similarity of odour to the oil distilled from the Bitter Almond." No doubt the plant intended is the *Prunus Laurocerasus*, most improperly called in our gardens "*Common* (or *Cherry*) *Laurel*." *Lavender*: cultivated to a great extent at Mitcham, Surrey; and the essential oil from the plants of this establishment is said to realize eight times the price in the market of that produced in France or elsewhere, and is fully worth the difference for delicacy of odour. The view given of these grounds represents them very near the Crystal Palace, Sydenham. *Lemon*. *Lemon-grass* (Andropogon Schœnanthus). *Lilac*. *Lily* (*of the valley*), imitation. *Magnolia* (ditto). *Marjoram*. *Meadow-sweet*. *Mignonette*. *Mint*. *Myrtle*. *Neroli*, or *Orange-flower*. *Nutmeg*. *Olibanum*. *Orris* (Iris Florentina). *Palm* (Elæis Guineensis?). *Patchouly* (Pogostemon Patchouly). *Pea* (*Sweet*). *Pine-apple*. *Pink*. *Rhodium*, distilled from *Convolvulus Scoparius*. *Rose*; the Otto or Attar of Roses of Cashmire is considered superior to any other: but the pure Otto requires to be diluted, or it has a "cloying sweetness." The finest preparation of Rose, as an odour, is made at Grasse in France. *Rosemary*. *Sage*. *Sandal*. *Sassafras*. *Storax* and *Tolu*. *Syringa*. *Thyme*. *Tonquin*. *Tuberose*. *Vanilla* (represented in the cut as growing on the outside of a hothouse). *Verbena*. *Violet*. *Vitivert*, or *Kuskuss*, roots of Anatherum (not "Anthoxanthum" as stated at p. 142) muricatum. *Volckameria*, a mixture of Violet, Tuberose, Jasmine, Rose, and Musk. *Wall-flower*. *Winter-green*:* this professes to be *Trien-*

* The name "*Winter-green*" is usually given to the genus *Pyrola*. *Trientalis* is

talis Europæa, but very improbable; it "yields a perfuming Otto principally consumed in the perfuming of soaps;" so celebrated, however, as to justify an imitation, under the name, too, of *Iceland Winter-Green*, "a very nice handkerchief perfume," made from tropical and other plants which never could grow in Iceland.

We have after the above, which come under the denomination of simple Extracts, a chapter or section on "*Bouquets* and *Nosegays*," so called in the trade, being mixtures of two or more simple Ottos in spirits, which, "properly blended, produce an agreeable and characteristic odour:" the names are inviting: we have *Bouquet d'Amour*, *Délices de Flora*, *Jockey Club*, *Yacht Club*, *Kew-Garden Nosegay*, etc. The odour of Lavender and the odour of Cloves mixed, *secundum artem*, we suppose, produce a new fragrance nicknamed "*Rondeletia*," "one of the most gratifying to the smelling nerve that has ever been made."

Among the *Dry* Perfumes are ranked *Locket powders* (perfumes put into a silk bag), *Tablets*, *Pastiles*, *Pot Pourri*, fumigation by *odoriferous resins* (the perfumes and incense of the ancients), etc.; and receipts are given for preparing the different kinds. *Perfumed Soaps* occupy a chapter: then follow *Emulsines*, *Milks*, *Emulsions*, *Cold Creams*, *Tooth-powders*, and we shall mention among the last, though not the least in importance (and a little out of our line), *Absorbent Powders*, without which "a lady's toilet-table is not complete," and this head includes *Rouges* and *Red-paints*. Of such we are told that many tons' weight are used in this country; and this may very well be, seeing that a principal ingredient of the *Liquid blanc* (*for theatrical use*) is Oxide of Bismuth, and that Madame V—, during her stage career, consumed more than half a hundredweight as a cosmetic!

MOORE, THOMAS, F.L.S.: *The* FERNS *of Great Britain and Ireland. Edited by* JOHN LINDLEY, Ph.D., F.R.S., etc. Imp. folio. Parts X. and XII. Nature-printed by Henry Bradbury. London. 1855.

This work has reached its 12th Fasciculus; the first nine of which

called *Chickweed Winter-green*; neither of them likely to yield perfumes by distillation. May not the *Gaultheria procumbens* of the United States be intended? and which is there sometimes called *Winter-green*,—of the essential oil of which an account is given by Dr. A. W. Hoffmann, and quoted by M. Piesse in the Appendix of his Work, p. 276.

have been already favourably noticed by us. The 10th Fasciculus commences with Tab. XXIX., *Lastrea Thelypteris*, which is very well represented. In the next, Plate XXX., the thickened stem and the copious fructifications of *Athyrium Filix-fœmina* render the figure very defective. This is acknowledged to be a cultivated specimen, and we should not consider it by any means a sample of the normal form of this species,—itself indeed very variable, as may be seen in the four following plates, where no less than eight varieties or forms are given, so different in aspect that one only wonders species-makers are not more united in considering several of these specifically distinct species, for it might be done with as much reason as in the *dilatata* group. Happily our author, in practice at least, takes a more correct view of things; and he very properly too places the four last of these eight states under the head of "(permanent?) *monstrous* forms," especially the three last (in Tab. XXXIV.), viz. *crispum*, *depauperatum*, and *dissectum*. The history of this well-known Fern occupies no less than twelve of these imperial folio pages, and 31 varieties (!) are named and distinguished. "We must also repeat," the author says, "in order that the truth may appear, that among herbarium specimens, in addition to those we have referred with tolerable certainty to the forms above enumerated, there are many others which could not be *satisfactorily* placed." It would be a marvel if they could; and he asks and answers the following questions:—"Does this long series of gradations" (that is from the normal form to absolute monstrosities) "represent a species? One can scarcely imagine two compound Ferns more dissimilar than the extreme state of the *molle* and *incisum* groups, or the forms represented in our Plates XXX. and XXXI. *C.* Or, after all, is there in nature no such thing as a species among plants, but ever-changing varieties, or races of individuals only? etc. The deep study of Ferns would be scarcely likely to produce a decided negative to this question." Certainly it is possible to study Ferns so as to leave the mind in inextricable doubts and difficulties; but it must be allowed that as far as regards the *Athyrium Filix-fœmina*, from the days of Linnæus until now, the majority of botanists have been uniform in their views of the limitation of this species. The author next, in Fasciculus 12, comes to the genus *Asplenium*, and Tab. XXXV. exhibits two species, both rare, or at least not of universal distribution, viz.:—

1. *Asplenium fontanum*, Bernh. (Polypodium, *Linn.*), Tab. XXXV. *A.*

—A very distinct species. It has occasioned no discussion on that head (except indeed with regard to the slight variety called *Halleri*), but in regard to the various localities given for it in Britain so much doubt and uncertainty have prevailed, that some botanists have altogether excluded it from the Flora of the British Isles. We believe we have thrown as much light on this subject as it will admit of in the last volume of this Journal (p. 340), and clearly shown that it has unquestionable right to be considered a native; and since that notice was published we have received a most obliging letter from the Rev. William Hawker (the veracity of whose locality cannot be called in question), and from which we give the following extract,—the more interesting as the same letter notes new stations for two other local Ferns:—"I had the good fortune to find the Fern in question (*Aspl. fontanum*) in the year 1852, on an old wall in my father's (Admiral Hawker's) grounds; there were about fifteen tufts of it, one of them nearly as large round as my hat. I had known of the existence of the Fern on this wall for several years, but only in 1852 commenced studying that class of botany, and then soon found out the value of my old neighbour. I think I can remember it on the wall nearly as far back as the year 1837, but, as that would take me back to ten years of age, I cannot vouch for any longer period. Mr. Borrer and Mr. Wollaston (of Chiselhurst) each paid the Fern a visit, and expressed themselves much pleased with it. I was over at my father's a few days ago (his place is only ten miles from here), and obtained some fronds for drying direct from the wall, a few of which I now have the pleasure to enclose you. I also enclose some fronds off a plant of the same species from Berlin, and some which I gathered last year on the Jura; both of these plants differ somewhat in habit from the British form of this species. You will perhaps be pleased to hear that last summer I had the good fortune to meet with two plants of *Asplenium Germanicum* in Cumberland, growing in company with *Woodsia Ilvensis* and *A. septentrionale;* I also, the year before, discovered (for the first time in the English lake-district) *Polystichum Lonchitis;* but I am not able to boast of all this without having worked 'like a horse' for it."

To the dubious list of recorded habitats of *A. fontanum* we could offer another, communicated by the Hon. Fox Strangways, in a note dated Abbotsbury, 16th January, 1856:—"I believe I can add a locality to the habitats of *Asplenium fontanum*, viz. the Falls of the

Turrit, at Ochtertyre, Perthshire, from whence I am promised specimens." As we have not heard since from our valued correspondent, it is presumed that no specimens have been communicated. This locality is of the more importance, for if correct it would be a strong confirmation of other northern ones, in Yorkshire, Northumberland, and especially Aberdeenshire, being so. The *Asplenium refractum*, a nurseryman's plant, here recorded as a new species,* to which the "*Hab.?* Scotland" is surely too hastily given, had better have been omitted. The British Fern Catalogue has been too much attempted to be increased of late on equally dubious authorities.

2. *Asplenium lanceolatum.*—Mr. Moore does well in figuring the *Asplenium lanceolatum*, Tab. XXXV. *B.*, on the same plate with *A. fontanum*; for distinct as they assuredly are, they are more nearly connected than others.

Asplenium Adiantum-nigrum, Tab. XXXVI. and XXXVII., is a species about which there has happily been little or no controversy, save in regard to the var. *acutum* (Aspl. acutum, *Bory*, A. productum, *Lowe*); and this we are happy to find united with *Aspl. Adiantum-nigrum*. Including the *acutum*, nine varieties are here recorded.

* One of the evil consequences of this is shown by the appearance in the 'Gardeners' Chronicle' of this day, March 15th, 1856, of the following advertisement:—"*New British Fern.—Asplenium refractum*, Moore. For description and *plate*" (unless our eyes grossly deceive us, there is *no* plate or figure whatever), "see March part of 'Nature-Printing.' R. Parker begs to offer the above *new* and *distinct species*, of which he possesses the entire stock. Plants forwarded, post free, on application, at 10*s.* 6*d.* each (!).—Paradise Nursery, Hornsey Road, Holloway." Thus here is a new British plant palmed upon us, which Mr. Moore notices (but certainly does not figure) under *Aspl. fontanum*, as a supposed variety of that, of dubious origin, under the name of *proliferum*, of Mr. Wollaston, "and which Mr. Moore considers so remarkably distinct, that were it not for the obscurity of its history, he would, without any hesitation, claim for it specific rank." Yet on the same page Mr. Moore goes on to say, "We are so satisfied with its distinctness, that notwithstanding its dubious history, we shall add the accompanying definition;" and here follow the name, character, and "Hab.? Scotland." Mr. Wollaston remarks of it, in the same page, "Its having been associated with *Asplenium viride*" (for some gardener's friend had found it in Scotland), "and partaking so much of the aspect of that species as to have deceived some of our best pteridologists, is at least circumstantial evidence of its British origin." It is said to be bulbiferous, and we do not see why Mr. Wollaston's name, *proliferum*, should not be retained, or at least referred to as a synonym.

6.

del. et lith.

Decades of Fungi; *by the* Rev. M. J. Berkeley, M.A., F.L.S.

Decades LI.–LIV.

(With Plates V., VI., IX., X.)

Rio Negro Fungi.

(*Continued from* vol. vi. p. 235.)

The very interesting collection of *Fungi* described in the following twelve Decades were transmitted by Mr. Spruce, and have just been distributed. In beauty and variety they exceed any previous collection. The following extract from a letter received from Mr. Spruce contains some interesting details respecting their habits and the locality in which they were found. It is curious that there is not the slightest indication of a new genus amongst them, though the collection abounds in new species.*

"The Rio Uaupés is the first locality in which I have met with *Fungi* in tolerable plenty, though the number of individuals is not at all to be compared with what I recollect having seen in England, in Fir-woods and other places, during the autumnal months; indeed, of many of the species I did not succeed in finding more than one or two specimens, and of those gathered in greater quantity the specimens were found growing mostly widely apart, and were collected at several times. The most interesting species, and the greatest variety, are found in what the Indians call Caá-guaçú, or great forest, where the trees are lofty and the soil good. Some of the *Fungi* of the Caá-guaçú grow on the ground; more on dead trunks, standing or fallen; but perhaps the greatest number of species is found on dead leaves and twigs, being principally *Agarici* and *Marasmii*, some of the former being so minute and so deliquescent as to be impossible to preserve. On the Uaupés, as on the Alto Rio Negro, there is a very large proportion of low forest, on a soil of a dry, white sand, mostly thinly covering the granite rock, which, although equally a "silva primæva" with the Caá-guaçú, produces only small trees of peculiar species found nowhere else, and shows here and there bare white places destitute of all vegetation, from which the Indians of Brazil call it Caa-

* All the new species in the set which, by the desire of Mr. Spruce, was sent to Dr. Montagne, have met with his approval. It is curious how very small a number in the collection are identical with those of Cayenne.

tinga, or the white forest; on the Venezuela side of the frontier it is called simply Monte Hajo, or low forest. The *Fungi* of the Caa-tinga are chiefly terrestrial, stipitate *Polypori*, growing subgregariously, and including a good many forms with differences so slight that they are probably all reducible to four or five species. The Gapó, or periodically inundated forest, afforded me a good many species, growing chiefly on decayed wood. In the Mandiocca-Roças and Capoeiras (deserted Roças overgrown with young forest) several species occur on burnt logs, which have apparently a wide distribution in tropical America, and some of them are possibly cosmopolites. One of them, which seems to be *Polyporus sanguineus*, I have seen in similar situations all the way up from Pará, and it is generally accompanied by two sessile *Agarici*. In the whole collection the genus *Polyporus* is vastly predominant, and I think it not impossible that if I could have remained at Panuré the whole winter, I might have got one hundred species in this genus alone. The collection would have been by no means so large had I not been aided in its formation by nearly all the juvenile population of Panuré, the boys being incited to the task by presents of fish-hooks and Jew's-harps, and the girls by the beads and looking-glasses. The girls were by far the most expert in the search, having, as it would seem, more patience than the boys. Their name for *Fungus* is 'Dichthybaki' in the language of the Zucana Indians, which is spoken throughout the lower half of the Uaupés, but in the Lingoa Geral, spoken throughout the Amazon and Rio Negro, it is 'Urupé.' At the Janguaraté-cachoeira (Tiger cataract) I am told that in the height of the wet season two species of *Fungi* were eaten, and I was shown the place where they grew, which was under the shade of the Umari-trees,* such as the Uaupé Indians are accustomed to plant near their houses for the sake of the fruit; but at that time (November) no trace of the *Fungi* was visible, and I could only conjecture from the description given me that one of them was an *Agaricus* and the other something like *Fistulina*."

501. *Agaricus* (Clitocybe) *Vespertilio*, n. s.; pileo cyathiformi cinerascente rimoso-striato; stipite elato sursum attenuato concolori, lamellis albidis subdistantibus decurrentibus. Spruce, n. 123.

* Trees belonging to the genus *Humirium*, from whose bark a perfume is extracted, much esteemed in Brazil, and the wood used in carpentry, especially for rafters.

HAB. On the ground. Panuré. February, 1853.

Pileus $1\frac{1}{2}$ inches or more across, cyathiform, with the margin inflexed, dark cinereous, rimoso-striate. Stem 4 inches or more high, $\frac{1}{4}$ thick, smooth, attenuated upwards, of the same colour as the pileus. Gills nearly white, moderately broad, rather distant, decurrent.

Allied to *A. cyathiformis*, but a far taller species, with nearly white gills, and remarkable for its rimoso-striate pileus.

502. *A.* (Clitocybe) *rudis*, n. s.; pileo irregulari subcarnoso sulcato rugoso; stipite elongato torto; lamellis crassis distantibus ventricosis decurrenti-adnexis armeniacis. Spruce, n. 127.

Pileus $1\frac{1}{2}$ inches across, irregular, strongly sulcate and transversely rugose, ochraceous. Stem 4 inches high, $\frac{1}{5}$ thick, twisted, paler above, reddish-brown below. Gills broad, distant, ventricose, yellow, emarginate behind and very slightly decurrent.

This species has exactly the habit of *A. laccatus*, but is evidently a very distinct species.

503. *A.* (Omphalia) *smaragdinus*, n. s.; totus viridis; pileo tenui fortiter umbilicato; stipite gracili filiformi æquali; lamellis tenuibus paucis decurrentibus. Spruce, n. 8.

HAB. On the ground. Panuré.

Green. Pileus $\frac{1}{2}$ an inch across, thin, deeply umbilicate, almost infundibuliform. Stem 1 inch high, $\frac{1}{4}$ line thick, equal, smooth, attached to the soil by a few white threads. Gills moderately broad, subtriangular, distant, decurrent.

The gills of this pretty species are far thinner than in any form of *A. umbelliferus*, and the habit more delicate. There is no doubt that it is a very distinct species.

504. *A.* (Omphalia) *euomphalus*, n. s.; pileo umbilicato tenui striato cinereo-albido; stipite gracili sursum dilatato lineato-striato; lamellis latis decurrentibus albidis. Spruce, n. 122, 133.

HAB. On the ground. Panuré. February, March.

Pileus $\frac{3}{4}$–$1\frac{1}{2}$ inches across, cinereous-white, deeply umbilicate, thin, striated. Stem $1\frac{1}{2}$–2 inches or more high, dilated upwards, umber when dry, fibrillose or lineato-striate, composed of fibres. Gills broad, dirty-white, decurrent.

A beautiful species and evidently very distinct. The pileus in the dry plant is deep rufous-brown. The specimens, under the two numbers specified above, were gathered at different times, and the latter are much the largest.

505. *A.* (Omphalia) *hypoleucus*, n. s.; albidus; pileo umbilicato ruguloso; stipite tenui deorsum incrassato tomentoso; lamellis latiusculis decurrentibus, interstitiis venosis. Spruce, n. 4.

HAB. On trunks of trees. Panuré.

Dirty-white. Pileus $\frac{1}{3}$ of an inch broad, convex, umbilicate, wrinkled. Stem 1 inch or more high, not a line thick, smooth above, tomentose below, fixed to the wood by a few delicate threads, attenuated upwards. Gills rather broad, ventricose, decurrent; interstices veiny.

A. (Nolanea) ——, Spruce, n. 119, 120, 134, 194.

Without notes or figures it is impossible to refer these to their proper species, and to describe them under distinctive names would be worse than useless. Number 134 has rather larger spores than the others: in all they are very irregular in form. The rose-spored Agarics are difficult enough to make out with fresh specimens; with dried specimens it is next to impossible to determine them.

506. *A.* (Hebeloma) *psamminus*, n. s.; albescens; pileo convexo glabro exsiccato rubro-fusco; stipite gracili glabro; lamellis ventricosis postice attenuato-affixis pallidis. Spruce, n. 124 (in part).

HAB. On the ground. Panuré.

Whitish. Pileus $\frac{1}{2}$ inch or more across, convex, smooth, even, red-brown when dry. Stem $1\frac{1}{2}$ inch high, $\frac{1}{2}$ a line thick, small, of the same colour as the pileus. Gills ventricose, rather broad, attenuated behind and attached to the top of the stem. Spores subreniform, $\frac{1}{3000}$ of an inch long, minutely echinulate.

There is no species in the section at all allied to it. I have placed it in a different division from *A. Panurensis* and *marasmioides*, on account of its very different gills.

507. *A.* (Naucoria) *Panurensis*; pileo convexo fulvello squamoso; stipite tenui concolore fibrilloso; lamellis latis adnatis e sporis fulvescentibus. Spruce, n. 124 (in part).

HAB. On the ground. Panuré.

Pileus 1–2 inches across, convex, tawny, speckled with darker, adpressed, minute, triangular scales. Stem 1 inch high, 1 line or more thick, of the same colour, stringy, fibrillose, solid. Gills broad, adnate, bright tawny from the spores. Spores $\frac{1}{4000}$ of an inch long, broad, subcymbiform, very obscurely echinulate.

This and *A. marasmioides* form a distinct group allied to *A. cerodes*, etc. This is far the most robust of the two.

508. *A.* (Naucoria) *marasmioides*, n. s.; pileo convexo subconico fulvo pulverulento; stipite gracili spadiceo glabro; lamellis latiusculis postice emarginatis. Spruce, n. 116.

HAB. Attached to fragments of wood. Panuré.

Pileus ½ an inch or more across, convex, subconical, tawny, clothed with abundant raised particles. Stem 1½ inch high, not a line thick, deep brown. Gills subventricose, emarginate behind and adnate, tawny. Spores oblong, $\frac{1}{4000}$ of an inch long, minutely echinulate.

This species at first sight looks like one of the tawny *Marasmii.*

509. *A.* (Crepidotus) *Alpiniæ*, n. s.; pileo resupinato reniformi cinereo-tomentoso; stipite brevissimo demum obsoleto pulverulento; lamellis angustis purpurascentibus in centro concurrentibus, acie pallidâ. Spruce, n. 114.

HAB. On dead stems of *Alpinia aromatica*. Rio Negro.

Pileus ½ an inch or more broad, resupinate, cinereous, finely tomentose. Stem extremely short, at length vanishing, pulverulent. Gills purplish-umber when dry, with a pale edge extremely narrow, nearly free. Spores $\frac{1}{4000}$ of an inch long, elliptic or subcymbiform, brown.

A very distinct and neat species. The rudimentary subpersistent stem gives it somewhat the air of the Borneo *A. columellifer*, B. The gills are not spiculate as in some allied species.

510. *Paxillus viridis*, n. s.; totus viridis; pileo ex umbilicato subinfundibuliformi tomentoso; stipite rugoso; lamellis crassis decurrentibus. Spruce, n. 3.

HAB. On the ground in woods.

Green. Pileus 1 inch across, subinfundibuliform clothed with short down. Stem short, blunt, ⅓ of an inch high, 2 lines thick, wrinkled. Gills decurrent, thick, irregular, rugose. Spores white, oblong, $\frac{1}{3000}$ of an inch long. Sometimes the stem is longer and not one-third as thick.

511. *P. retiarius*, n. s.; pileo convexo leviter umbilicato subtiliter tomentoso; stipite e mycelio expanso oriundo; lamellis angustis decurrentibus ramoso-reticulatis. Spruce, n. 118.

HAB. On sandy soil. Panuré. March, 1853.

Pileus convex, ½ an inch or more across, umbilicate, finely downy. Stem 1 inch or more high, equal or dilated above, ½–1 line thick, smooth. Gills narrow, decurrent, branched and reticulated.

I have no notes as to the colour of this species, which is highly

curious. The hymenium resembles that of a *Marasmius*. Numbers 108, 110, are allied species, but indeterminable without notes.

* *Hygrophorus nitens*, Sow. (sub *Agarico*), tab. 71.

HAB. On the ground. Panuré. February, 1853.

The specimens are scarcely satisfactory, but the change of colour from pure white to deep red-brown is so striking, that I am inclined to think the species either identical or closely allied.

512. *H. siparius*, n. s.; coccineus; pileo e convexo umbilicato furfuraceo-velutino; stipite elongato valido glabro; lamellis decurrentibus. Spruce, n. 130.

HAB. On the ground. Panuré.

Scarlet. Pileus $\frac{3}{4}$ of an inch across, convex, at length umbilicate, clothed, except at the edge, with a dense furfuraceo-villous coat. Stem 2 inches high, $\frac{1}{4}$ of an inch thick, smooth, nearly equal. Gills truly decurrent.

Closely allied to *H. miniatus*, but a stouter and more robust plant, with truly decurrent gills, and a very decided dense furfuraceous coat. There is another species with a furfuraceous pileus, which may possibly be a form of *H. miniatus*: there is however only a single specimen, Number 98.

* *Cantharellus cibarius*, Fr. Ep. p. 365. Spruce, n. 121.

HAB. On sandy ground in woods. Panuré. March, 1853.

513. *C. pusio*, n. s.; albescens; pileo infundibuliformi striato pulverulenti-flocculento; stipite sursum dilatato; plicis angustissimis decurrentibus, interstitiis sublævibus. Spruce, n. 94.

Whitish. Pileus $\frac{1}{3}$ of an inch across, infundibuliform, thin, striate, sprinkled with little flocculent specks. Stem 1 inch high, $\frac{1}{3}$ of a line thick, brownish when dry, pulverulent, dilated above. Folds very narrow, obtuse, entire, decurrent. Interstices even.

514. *Heliomyces Sprucei*, n. s.; pileo umbilicato umbrino, radiis pallidis antice furfuraceis picto; stipite brevi sursum dilatato fibrilloso pallido; lamellis decurrentibus distantibus pileo concoloribus; interstitiis lævibus. Spruce, n. 91.

HAB. On sticks. Panuré.

Pileus $\frac{3}{4}$ of an inch across, umbilicate, deep umber, painted with paler lines, which are furfuraceous in front. Stem pale, $\frac{3}{4}$ of an inch high, not $\frac{1}{2}$ a line thick, incrassated above, rough with little fibres. Principal gills about twenty. Interstices even, dark like the pileus, shortly decurrent.

The gills are more in number and darker than in *H. elegans*, Lév., and the whole habit different.

* *Marasmius plectophyllus*, Mont. Ann. d. Sc. Nat. sér. iv. vol. i. p. 111. Spruce, n. 113.

Hab. On wood. Panuré.

Distinguished at once from allied species by its short farinose or furfuraceous stem.

515. *M. hædinus*, n. s.; pileo campanulato albo opaco, centro umbilicato venoso-rugoso, margine crenato; stipite pallide umbrino strigoso-affixo; lamellis paucis angustis, interstitiis latissimis ut plurimum lævibus. Spruce, n. 31.

Hab. On dead leaves. Panuré. March, 1853.

White or cream-coloured. Pileus 1 inch across, campanulate, umbilicate and venoso-rugose in the centre, marked with radiating lines; margin crenate. Stem short, umber, smooth, fixed by strigose threads, 1 inch high, not a ¼ of a line thick. Gills about ten, narrow, with smooth, broad interstices.

An extremely elegant species; the pileus has an opaque aspect resembling that of kid-leather.

516. *M. leoninus*, n. s.; pileo campanulato e centro striato rugoso fulvello; stipite gracili pallide umbrino; lamellis latis distantibus adnatis; interstitiis rugosis. Spruce, n. 112.

Hab. On dead leaves in woods near Panuré. March, 1851.

Pileus 1 inch or more across, campanulate, tawny, striated with páler lines from the centre, rugose. Margin more or less toothed. Stem 1½–2 inches high, ½ a line thick, pale umber, opaque, adhering by a few strigose threads, even, scarcely striate. Gills pale, distant, moderately broad, adnate.

One of the finest species of the genus, of a beautiful pale tawny tint, with an elegantly sculptured pileus.

517. *M. rhabarbarinus*, n. s.; pileo convexo membranaceo rhabarbarino; stipite elongato filiformi glabro obscuriori, basi strigosa adfixo; lamellis paucis pallidis subvenosis. Spruce, n. 140.

Hab. On dead leaves. Panuré. March, 1853.

Pileus ½ an inch or more across, campanulate, membranaceous, tawny, sometimes reticulated from the contraction of the external membrane. Stem filiform, 1 inch or more high, ¼ of a line thick, paler than the pileus, fixed by radiating strigose tawny threads. Hymenium pale. Gills venose. Interstices sometimes wrinkled.

518. *M. tageticolor*, n. s.; pileo membranaceo umbonato puniceo spadiceove radiis luteis picto, margine lato dentato; stipite tenui pallido opaco; lamellis paucis luteis ventricosis postice attenuato-liberis. Spruce, n. 37. (Tab. V. fig. 1.)

Hab. On dead twigs, stipules, etc. Panuré.

Pileus 2–8 lines across, convex, membranaceous, umbonate, varying from reddish-brown to deep crimson, adorned with from eight to ten yellow rays, very minutely wrinkled. Stem 1–1½ inch high, setiform, opaque, pale umber. Gills narrow, ventricose, attenuated behind and free, yellow like the rays. Interstices very broad, even.

Nothing can be conceived more exquisite than the colouring of this species, which appears to be pretty common. It has the rich tints of the African Marigold. (Tab. V. fig. 1. *M. tageticolor*, *nat. size.*)

* *M. fulvus*, Mont. MSS. Coll. Lep. n. 1080. Spruce, n. 104.

Hab. Panuré.

The only specimen is paler than the plant of Montagne, but it is, I believe, the same thing. In both the gills are almost too thin for the genus *Marasmius*.

519. *M. helvolus*, n. s.; pileo campanulato helvolo sublævi, margine undulato; stipite fusco insititio, basi non strigosa; lamellis paucis ventricosis adnexis; hymenio pallido. Spruce, n. 139.

Hab. On dead leaves.

Pileus ½ an inch or more across, campanulate, rufous, tawny, nearly uniform in tint, even; margin waved. Stem 1 inch or more high, filiform, brown, striate, not fixed by strigose threads. Hymenium pale. Gills few, ventricose, adnexed.

Allied to *M. rhabarbarinus*, but differing in the darker stem, which is adfixed by strigose threads, and other points.

* *M. ferrugineus*, B., Lond. Journ. Bot. vol. ii. p. 630. Spruce, n. 90.

Hab. On dead leaves. Panuré. March, 1853.

* *M. fulviceps*, B., Lond. Journ. Bot. vol. vi. p. 490. Spruce, n. 100, 92.

Hab. On decayed trunks. Panuré. March, 1853.

520. *M. flammans*, n. s.; pileo membranaceo aurantio-fulvo e centro lineis pallidioribus picto; lamellis ochraceis angustis postice attenuatis attingentibus; stipite filiformi pallide fusco lævi. Spruce, n. 97.

Hab. On dead leaves. Panuré.

Pileus 1 inch across, membranaceous, bright orange-tawny, painted with paler lines radiating from the centre; margin waved. Stem 2 inches high, $\frac{1}{4}$ of a line thick, smooth, filiform, pale brown, scarcely striated. Gills about twenty, exclusive of the shorter ones, ochraceous, narrow, attenuated behind. Interstices nearly even.

521. *M. pœcilus*, n. s.; pileo campanulato fulvo; stipite umbrino insititio; lamellis flavis ventricosis adnexis; interstitiis lævibus fulvis. Spruce, n. 139.

HAB. On dead leaves in woods. Panuré. February, 1853.

Pileus campanulate, $\frac{1}{3}$ of an inch across, tawny, rarely radiated with yellow. Stem setiform, $1\frac{1}{2}$ inch high, umber, springing, for the most part abruptly, from the matrix. Gills ventricose, yellow. Interstices smooth, tawny, red.

This species is distinguished from *M. helvolus* by Mr. Spruce in his notes, and is certainly as worthy of distinction as most of the allied species.

* *M. hæmatocephalus*, Mont.

HAB. On dead twigs. Panuré.

A small form, n. 78, with a rose-coloured pileus, and pale ventricose gills, on leaves of some species of *Icica*, appears to belong to the same species.

* *M. atrorubens*, B., Lond. Journ. Bot. vol. i. p. 138. Spruce, n. 105, 101, 106.

HAB. Amongst dead leaves and branches. Panuré. March, 1853.

* *M. decurrens*, Mont., Ann. des Sc. Nat. sér. iv. vol. i. p. 118. Spruce, n. 107.

HAB. On dead twigs. Panuré. An abundant species. March, 1853.

522. *M. Caatingensis*, n. s.; albescens; pileo e convexo plano-depresso striato-picto; stipite subfusco sursum pulverulento flocculoso; lamellis angustis decurrenti-adnexis. Spruce, n. 85, 86, 87, 95.

HAB. On the ground in Caatingas (scrubby woods), near the River Uaupés. March, 1853. A common species.

Pileus $\frac{1}{4}$–$\frac{3}{4}$ of an inch across, at first convex, then plano-depressed, beautifully striate. Stem 1–$1\frac{1}{2}$ inch high, $\frac{1}{4}$ of a line thick, brownish, sprinkled above with little flocculent specks. Gills narrow, distant, decurrenti-adnexed.

This species is closely allied to *M. Brasiliensis*, Mont. et Berk., but the gills in that species are truly decurrent.

523. *M. dilatatus*, n. s.; pileo e campanulato plano-depresso; stipite fusco subpulverulento sursum dilatato; lamellis angustis numerosis decurrenti-adnexis subremotis. Spruce, n. 93, 109.

HAB. On dead branches. Panuré.

White. Pileus ⅓–½ an inch across, conico-campanulate, at length plano-depressed, thin, membranaceous, striated, smooth. Stem 1 inch high, not ¼ of a line thick, brown, slightly pulverulent, with sometimes a little matted mycelium at the base. Gills very numerous, narrow, decurrenti-adnexed, all ending together, so as to leave a pale space at the dilated top of the stem.

524. *M. omphalodes*, n. s.; pileo plano umbilicato albido, centro umbrino, primum squamuloso, glabrescente; stipite elongato subtiliter furfuraceo-tomentoso; lamellis angustis decurrentibus. Spruce, n. 131.

HAB. On fragments of dead vegetables. Panuré. February, 1853.

Pileus ½–1 inch broad, plane, umbilicate, thin, dirty white, umber-brown in the centre, at first squamulose. Stem 2 inches or more high, ½–1 line thick, furfuraceo-tomentose, brown, dilated above. Gills narrow, decurrent, liver-brown when dry.

This species is just intermediate between *Marasmius* and *Omphalia*. The furfuraceous stem resembles rather *Marasmius* than analogous Agarics.

525. *M. pulchellus*, n. s.; pileo campanulato sublævi; stipite rufo pulverulento; lamellis confertis angustis adnatis. Spruce, n. 99.

HAB. On dead leaves. Panuré.

Pileus ½ an inch across, campanulate, slightly striate. Stem 1–2 inches high, setiform, rufous or brown, pulverulent. Gills numerous, crowded, narrow, adnate, with occasionally a slight decurrence.

Allied to *M. insititius*, but distinguished by its more even pileus, and more crowded, narrow gills.

526. *M. cladophyllus*, n. s.; pileo convexo hepatico rugosiusculo; stipite filiformi fusco basi strigosa affixo, lamellis ventricosis latiusculis ochraceis ramoso-reticulatis. Spruce, n. 89.

HAB. On dead leaves. Panuré.

Pileus ¼ of an inch across, convex, liver-brown, slightly rugose. Stem 3 inches high, brown, smooth, fixed by a few strigose threads. Gills rather broad, ochraceous, ventricose, joined by transverse branched processes nearly as broad as themselves.

527. *M. epileucus*, n. s.; candidus; pileo umbilicato tomentoso;

stipite brevi farinoso e strato ceraceo-fibroso oriundo; lamellis paucis adnato-decurrentibus.

HAB. On dead sticks. Panuré, and at foot of Mount Cocui.

White. Pileus 1 line across, umbilicate, clothed with a close-pressed, matted down. Stem 1½–2 lines high, ¼ of a line thick, pulverulent, springing from a corticioid mass, which runs over a few fibres. Gills few, adnate, decurrent.

528. *M. nivosus*, n. s.; niveus; pileo umbilicato sulcato; stipite brevi adscendenti pulverulento-tomentoso; lamellis paucis decurrenti-adnatis obtusis.

HAB. On sticks, fern, etc. Foot of Mount Cocui and Panuré.

White. Pileus 2 lines broad, deeply umbilicate and sometimes umbonate, sulcate, opaque, obscurely tomentose; border arched. Stem short, ⅓ of an inch high, not ½ a line thick, ascending, dilated above, tomentose, springing from a little round patch of mycelium. Gills ten to twelve, decurrenti-adnate, extremely obtuse, sometimes forked.

Allied to *M. epileucus*, but perfectly distinct.

529. *M. obscurus*, n. s.; pileo convexo demum plano e brunneolo griseo-subluteo; stipite subrufo, tenui; lamellis paucis lato-adnatis albidis. Spruce, n. 138.

HAB. On dead leaves. Panuré.

Pileus at first brownish, convex, then yellowish-grey, plane, 1 line across. Stem ⅓–½ inch high, filiform, rufous, pulverulent below, sometimes springing from an Himantioid mycelium. Gills about ten, whitish, broadly adnate.

This is an obscure species, but the characters are sufficiently marked to distinguish it from others.

530. *M. bellus*, n. s.; pileo planiusculo pallido reticulato-rugoso; stipite elongato gracili e mycelio contexto oriundo; lamellis tenuibus distantibus; interstitiis reticulatis. Spruce, n. 102 (var.).

Pileus 1 inch across, pale tan, plane, slightly umbilicate, reticulato-rugose. Stem 2 inches high, ¼ of a line thick, dark brown, smooth, springing from a closely matted mycelium. Gills moderately broad, distant, attached to the top of the stem. Interstices reticulate.

Another form, as it appears, has the lower part of the stem opaque and pale umber-brown. The only specimen is however too bad to say much about it.

531. *M. Hippiochætes*, n. s.; pileo convexo sulcato coccineo; lamellis

pallidis adnatis; stipite longissimo nigrescente apice pallido, hic illic noduloso prolifero. Spruce, n. 88.

Hab. On wood, stalks, etc., in forests on the River Uaupés. March, 1853.

Pileus 1–1½ line across, hemispherical, sulcate, scarlet. Stem 4–5 inches high, extremely slender, rigid, shining, pale at the apex, gradually becoming darker downwards, and at length black, interrupted here and there by joint-like knots, occasionally giving off towards the apex branches, which are again branched, principally on the upper side, and terminated by a minute pileus. Gills few, pale, adnate.

Allied to *M. hæmatocephalus*, but a smaller species, and remarkable for its ramification. Its nearest ally is *M. polycladus*, Mont., from which it differs in its pale gills.

532. *M. cupressiformis*, n. s.; stipite communi longo setiformi nigrescente sursum prolifero-racemoso, ramulis divaricatis; pileis candidis sulcatis umbilicatis; lamellis paucis concoloribus collariatis. Spruce, n. 75. (Tab. V. fig. 3.)

Hab. On dead leaves. Panuré.

Stem 3½ inches high, setiform, attenuated upwards, at length black, sulcate; branched about one-half or one-third from the base. Ramuli divaricate, then curved upwards, about 2 lines long, each bearing a pileus. Pilei convex, white, sulcate, umbilicate, with a dark process from the centre of the umbilicus, as if the stems ran quite through the pileus; below the gills, at some distance, there is a little projection, as if a new stem had arisen at that point. Gills white, fixed to a common collar.

A very elegant production. (Tab. V. fig. 3. *M. cupressiformis, natural size*, with pileus magnified.)

533. *M. populiformis*, n. s.; stipite communi longo setiformi aureo sursum racemoso; pileis convexis fuscis paucisulcatis; lamellis 5–6 concoloribus. (Tab. V. fig. 2.)

Hab. On dead twigs, etc. Panuré.

Stem 4 inches high, setiform, much attenuated upwards, golden-yellow, branched in a racemose manner above; branches set on at an angle of about 60°, then curved upwards, 1–3 lines long, each bearing a pileus. Pileus ⅓ of a line across, brown, with five or six furrows. Gills of the same colour.

Much resembling *M. cupressiformis*, but differing altogether in co-

lour, and somewhat in appearance, as the branches are more confined to the apex. The uncoloured figure is insufficient to express the difference. (Tab. V. fig. 2. *M. populiformis*, *natural size*, with the pileus magnified.

534. *M. coilobasis*, n. s.; totus albus; pileo convexo membranaceo; stipite e disco orbiculari centro depresso oriundo; lamellis angustis linearibus; interstitiis venosis. Spruce, n. 1.

HAB. On dead trunks. Panuré.

Pileus $\frac{3}{4}$–1 inch across, convex, smooth, white, membranaceous. Stem $\frac{3}{4}$–1 inch high, not $\frac{1}{2}$ a line thick, smooth, springing from an orbicular disc, which is hollowed out in the centre. Gills narrow, linear. Interstices veined.

The disc from which the stem springs calls to mind *Agaricus platypus*, but the other characters are very different.

* *Lentinus villosus*, Fr. Ep. p. 388. Spruce, n. 128.

HAB. On decayed wood. March, 1853. Panuré. San Carlos del Rio Negro. April, 1853.

* *L. fumigatus*, Lév., Ann. d. Sc. Nat. Sér. iii. vol. v. p. 117. Spruce, n. 129.

HAB. On dead wood. Panuré.

535. *L. Nicotiana*, n. s.; pileo umbilicato tabacino squamis pallidis contextis variegato; stipite adscendente pallido rigido-squamoso; lamellis lilacinis decurrentibus basi furfuraceis. Spruce, n. 45. (Tab. V. fig. 7.)

HAB. On decayed trunks. January. Panuré.

Pileus 2 inches across, deeply umbilicate, brown, variegated with subtriangular, pale and patent scales, which are composed of close-set flocci. Stems ascending, irregular, pale, connate, rough with a few furfuraceous rigid scales. Gills lilac, denticulated, decurrent, very narrow below, where they are clothed with furfuraceous pubescence, so as to have the appearance of ending abruptly.

The pileus has much the colour of that sort of tobacco (bird's-eye) which is variegated with paler patches. The gills are described by Mr. Spruce as lilac when fresh; in the dried plant they are greyish. (Tab. V. fig. 7. *L. Nicotiana*, *nat. size.*)

* *L. Lecomtei*, Fr. Ep. p. 388. Spruce, n. 135.

HAB. On decayed wood. March, 1853. Panuré.

536. *L. calvescens*, n. s.; pileo ex umbilicato subinfundibuliformi

pallido primum villoso, demum calvescente; margine lobato; stipite brevi nudo; lamellis subdistantibus longe decurrentibus latiusculis, acie tenui subintegra. Spruce, n. 136.

HAB. On decayed trunks of trees. February, 1853. Panuré.

White. Pileus 3 inches across, thin, umbilicate, subinfundibuliform, at first clothed (at least in the centre) with long, tow-like hairs, then quite smooth, striate; margin lobed and crenate; sometimes however nearly entire, and fissured in the direction of the gills. Stems $\frac{1}{2}$–1 inch high, 2 lines thick, often connate, nearly naked. Gills rather distant, broadish, decurrent, but not ending abruptly; edge very thin, entire, or only a little uneven; not regularly denticulate.

The distinctive character of this species, of which I have seen many specimens, is the change in the nature of the surface which takes place with age.

The surface of the pileus, indeed, resembles that of *Lentinus subnudus*, but the gills in that species are closer and thinner.

* *L. tener*, Kl. MSS.

HAB. On decayed wood with *L. villosus*, from which its strongly glandular gills at once distinguish it.

537. *Panus reticulatus*, n. s.; pileo plano depresso fuligineo reticulato, stipite gracili concolore; lamellis pallidis angustis confertis breviter decurrentibus postice reticulatis. Spruce, n. 130.

HAB. On the ground amongst leaves, etc. March, 1853. Panuré.

Pileus $\frac{1}{2}$–$\frac{3}{4}$ of an inch across, plano-depressed, dingy, more or less sometimes very strongly reticulated; thin. Stem of the same colour as the pileus, 1–2 inches high, 1 line or more thick, smooth. Mycelium white, forming little tooth-like bristles. Gills narrow, close, at first obtuse, anastomosing behind. Spores (if really belonging to the species) globose, strongly echinulate, $\frac{1}{3500}$ of an inch in diameter.

This is a very curious species, approaching the genus *Cantharellus*. I regret that I have not sufficient materials to say more about it.

538. *P. Sprucei*, n. s.; pileo excentrico flabelliformi striatim subrugoso livido siccitate albescente, margine lobato; stipite brevi compresso; lamellis subdistantibus nigris decurrentibus postice cum stipite subtiliter tomentosis integris. Spruce, n. 74. (Tab. V. fig. 6.)

HAB. On decayed wood. Panuré.

Pileus $1\frac{1}{2}$ inch long, 2 inches broad, depressed behind, flabelliform, lobed, livid, whitish when dry, opaque from very minute matted down,

marked here and there with little raised lines. Stem confluent with the pileus, compressed, short, minutely tomentose, attached by an irregular disc, which is rough with little gill-like processes. Gills dark brown or black, moderately broad and distant, entire, decurrent, thin; base clothed like the stem.

On a larger scale than *P. dealbatus*, and of a less pure white when dry. *Panus Vriesii* and *P. melanophyllus* are allied but distinct species. The little elevations at the base are not, I think, entirely dependent on the inequalities of the matrix. (Tab. V. fig. 6. *P. Sprucei, nat. size.*)

* *Schizophyllum commune*, Fr. Ep. p. 403. Spruce, n. 137.

Hab. Abundantly in recently cleared ground throughout the Rio Negro and Uaupés districts.

* *Lenzites applanata*, Fr. Ep. p. 404. Spruce, n. 66 (junior).

Hab. On dead trunks. Jauaraté-cachoeira. February, 1853.

* *L. deplanata*, Fr. Ep. p. 404. Spruce, n. 65, 59.

Hab. On dead trunks. Jauaraté-cachoeira. October, 1852. Marginal zones slightly tawny.

* *L. striata*, Fr. Ep. p. 406. Spruce, n. 132.

Hab. Very frequent on half-burnt logs in roças on the Rio Negro and Uaupés.

539. *Polyporus* (Mesopus) *augustus*, n. s.; pileo orbiculari crassiusculo coriaceo suberoso, profunde umbilicato, crebri-zonato, rugoso, umbrino albo-variegato; stipite valido umbrino, epidermide crustacea; hymenio primum plano, sicco concavo, albo, poris minutis punctiformibus. Spruce, n. 211.

Hab. On a dead branch. January, 1853. Panuré.

Pileus 10 inches across, orbicular, coriaceo-suberose, moderately thick, convex, with a broad umbilicus, marked all over with radiated wrinkles and very numerous zones, umber, variegated with white; substance white. Stem 5 inches high, rather uneven, slightly incrassated upwards, 1 inch thick. Hymenium white, plane when fresh, concave when dry. Pores minute, $\frac{1}{150}$ of an inch across, punctiform.

This most magnificent species resembles *Pol. sacer*, from which it differs in its more frequently-zoned, rugose pileus, its smooth not velvety stem, and its minute pores. Only a single specimen appears to have been found.

540. *P.* (Mesopus) *camerarius*, n. s.; pileo crassiusculo rigido pul-

vinato in mesopodibus umbilicato opaco umbrino zonis crebris picto subintegro; stipite elongato irregulari pileo obscuriore pruinoso; hymenio concavo albo; poris punctiformibus contextu pallido zonato. Spruce, n. 171, 197.

HAB. On dead trunks. Panuré. March, 1853.

Pileus 2–4 inches across, pulvinate, umbilicate when central, rather thick, hard, rigid, opaque, dull pale umber, with numerous darker zones nearly even. Stem 2–7 inches high, $\frac{1}{4}$–$\frac{1}{8}$ of an inch thick, pruinose, more tawny than the pileus. Hymenium white, concave. Pores punctiform, ending abruptly.

The lateral individuals (197) are larger, but there is no real difference. It is a very beautiful species; edge not grooved. The mesopod specimen was included in n. 194.

(*To be continued.*)

Definitions of Rare or hitherto Undescribed AUSTRALIAN PLANTS, *chiefly collected within the boundaries of the Colony of* Victoria; *by* Dr. FERDINAND MUELLER, Government Botanist for the Colony of Victoria.

(*Continued from p.* 72.)

XXV. LORANTHACEÆ.

96. Loranthus (Sect. *Dendropththoë*) *canus*, F. Muell.; squarrose, grey-lepidote; branchlets below terete; leaves alternate, petiolate, long-lanceolate, more or less falcate, nearly blunt, generally three-nerved, indistinctly veined; cymes axillary, with only two branchlets, bearing each three flowers; flowers pentamerous, outward grey-lepidote, the intermediate one sessile, with an oblong bracteole, the lateral ones on a short and thick pedicel, with a roundish navicular bracteole; calyx five-toothed, as well as the bracteoles ciliolate; anthers linear, affixed with the base; style filiform; berries urceolate-ovate, greyish-yellow, succulent.

HAB. Along the Mackenzie Creek at the Grampians, on the Buffalo Creek, and the Upper Ovens, parasitical on *Acacia mollissima*; at both of those localities rare.

I regret not having been able to examine well-developed flowers of this plant. The leaves are not unlike those of *L. pendulus* (*L. Miquelii*,

Lehm.) and *L. eucalyptoides*. The fruits offer very decisive marks of distinction amongst the numerous species; thus they are in *L. canus* more succulent, shorter, and with a less contracted border, and not of a greenish-brown colour, as in *L. pendulus*. In *L. Preissii* the berries are pink, spherical, and of the size of a pea; in *L. Exocarpi* black, large, ovate; in *L. eucalyptoides* oblong, pear-shaped, green, with a yellowish top. All the described species require a careful new disquisition, as they are not only parasites of various plants similar to each other, but also of genera of very different Natural Orders. Thus *L. eucalyptoides* produces, as long as it adheres to *Eucalypti* or *Casuarinæ* (or now also to *Virgilia Capensis*), long falcate leaves, which, when the plant receives its nourishment from *Banksia integrifolia*, assume an ovate-orbicular shape, and a very fleshy consistence, whilst the flowers become sessile.

On a former occasion I alluded to the singular circumstance that the genus should be foreign to Tasmania; although it is here not only amply represented, but also reaches the shores of Wilson's Promontory, and exists in New Zealand.

XXVI. Caprifoliaceæ.

97. Sambucus *xanthocarpa*,* F. Muell.; arboreous; leaves pinnately three- or five-foliolate or bipinnate, smooth, without stipules; leaflets lanceolate or ovate-lanceolate, long-acuminate, with exception of the basis sharp-serrated; cymes with five or seven principal branches; flowers three- or rarely four-parted; berries yellow, three-seeded.

Hab. On the shady moist banks of the Brodribb, Snowy, and Cabbage-tree Rivers.

A tree with the habit of the common Elder, and perhaps of equal utility.

XXVII. Rubiaceæ.

98. Diodia (Sect. Eudiodia) *reptans*†, F. Muell.; perennial, herbaceous, much branched; stems rooting; leaves ovate, acutish, petiolate, glabrous or covered with short stiff hair, always ciliate; stipular va-

* *Tripetalus Australasicus*, Lindl.

† This is not a *Diodia*, but a *Nertera*, or closely allied plant, very similar to *N. setulosa*, Hook. fil. (Fl. N. Zeal. i. 112. t. xxviii. *B.*), agreeing with this plant in the slender corolla, but differing in the two-lipped calyx. The generic character of *Nertera* should be modified to include several plants, chiefly differing in the structure of the calyx-lobe.

gina truncate, with or without short bristles; flowers axillary and terminal, solitary, on very short peduncles, not opposite to each other; tube of the corolla very thin, much longer than the bidentate limb of the calyx; stamens and style exserted, the latter divided nearly to the base, its divisions capillary; fruits ovate, tapering into the base, nearly glabrous, crowned by the twice or three times shorter, deltoid, acuminate, ciliate, nearly erect teeth of the calyx.

Hab. Mountain pastures, and plains along the Snowy River.

One of the most southern localities of a tribe of plants, which abounds within the tropics. *Nertera depressa* shares its localities.

Its nearest related congener seems to be *Diodia Virginica*.

99. Galium (Sect. Leiaparine) *geminifolium*, F. Muell.; somewhat scabrous, otherwise smooth; stems long, flaccid, decumbent, with dichotomous branches; leaves remote, linear, acutish, one-nerved, reflexed on the margin, rarely four developed in a whorl, generally two of them wanting or reduced to a tooth-shaped stipule; flowers hermaphrodite, panicled; peduncles straight, divaricate, solitary, twin, or several together; pedicels very short; lobes of the small yellowish corolla lanceolate-ovate, much longer than the stamens; fruits glabrous, densely dotted.

Hab. Along the margin of the Murray and Avoca.

This insignificant herb may be considered a valuable acquisition to the botanical system, inasmuch as it furnishes means of ascertaining the true nature of the stipular leaves in *Stellatæ*, proving apparently that this tribe cannot be separated by natural characters from the Rubiaceous Order.

XXVIII. Compositæ.

100. Erigeron *conyzoides*,* F. Muell.; perennial, smooth, somewhat glabrous; stem erect, herbaceous, leafy, below simple; lower leaves lanceolate, tri-nerved, tapering into a long petiole, remotely and sharply serrulate, upper ones broad-linear, acute, quite entire, sessile; flower-heads panicled, hemispherical or campanulate; scales of the involucre linear-subulate, somewhat scabrous on the back; female flowers extremely narrow, whitish, flat, little longer than the disc; achenia compressed, oblong, scantily hairy, hardly half as long as the pappus.

Hab. Sources of the Murray and Snowy Rivers (4–5000 feet).

101. Calotis (Sect. Eucalotis) *glandulosa*, F. Muell.; pubescent from

* Scarcely differing from *E. Bonariensis*, L.—Ed.

gland-bearing hair; rhizome divided, somewhat woody; stems numerous, procumbent or adscendent, leafless at the summit; leaves obovate or oblong-cuneate, the uppermost sessile, the rest tapering into a petiole, beyond the middle toothed or laciniate; scales of the involucre ovate-lanceolate, glandulous-pubescent; achenes ovate-cuneate, very strongly compressed, deep brown, glabrous, asperous, with a thin margin; awns four to seven, setaceous, unequal in length at the apex, retro-aculeate, scabrid at the base, alternating with an equal number of oblong or obovate-cuneate scales, which are ciliate at the top.

Hab. On dry grassy ridges near the Snowy River and its tributaries, towards Maneroo. The colour of the ray is blue, as in *C. cuneifolia*, *lasiocarpa*, and *dentex*. This character is not without importance for distinguishing the various species. Thus *C. dilatata*, *anthemoides*, *scapigera*, and *scabiosifolia* have whitish radial flowers; *C. microphylla*, *Muellerii*, *multiseta*, *erinacea*, and *lappulacea*, yellow ones. Those of *C.* (*Cheiroloma*) *hispidula*, *cymbacantha*, and *breviseta*, are yet to be observed.

The genus *Cheiroloma* may be referred as a fifth section to this genus.

102. Calotis (Sect. Acantharia) *anthemoides*, F. Muell.; smooth; root fibrous, producing runners; stems simple; radical leaves on long petioles, pinnately divided, the lower segments linear, entire, the rest pinnately cut into linear-acute divisions; leaves of the stem small, remote, sessile, lanceolate, entire or rarely toothed; scales of the involucre few, disposed in two rows, ciliate, but smooth on the back, outer ones almost round; achenia cuneate, a little compressed, margined and broadly winged, with exception of the tops, even and smooth; awns generally eight, valid, retro-hispid, alternately very short, and of the length of the achenium.

Hab. In muddy localities in the neighbourhood of Station Peak.

A singular plant, differing from the rest of the species, as well in habit as in the hermaphrodite flowers of the disc. Ray whitish.

103. Brachycome *leptocarpa*, F. Muell.; annual; leaves linear-cuneate, as well as the branches covered with articulate hair, at the upper end cut or pinnatifid, their teeth or segments acute; peduncles naked, filiform, upwards smooth; scales of the involucre blunt, glabrous; achenia cuneate-linear, compressed, pale brown, with naked margin, on both sides hairy-scabrous; pappus conspicuous.

Hab. In low grass-land, not unfrequent in the colony of Victoria, as well as in South Australia. Similar to *B. debilis*.

104. Brachycome *ptychocarpa*, F. Muell.; annual, glabrous; scapes filiform, generally naked; leaves pinnatisected, with linear-acute segments; scales of the involucre blunt, ciliolate; achenia very small, brown, surrounded by a ciliolate wing, on both sides with three hairy-scabrous ribs, the middle rib more prominent; pappus minute.

HAB. In the Buffalo Mountains.

Like the following, a small tender herb.

105. Brachycome *nivalis*, F. Müell.; perennial, herbaceous, smooth; leaves all radical, somewhat carnose, pinnatisected or rarely entire, on long petioles, their segments distant, linear, entire or pinnatipartite, acute; rachis linear; stems simple, much longer than the leaves, naked or with a solitary bractea; scales of the involucre lanceolate-oblong, with ciliate torn margins; receptacle hemispherical; achenia compressed, oblong-cuneate, with a conspicuous pappus; those of the disc very narrowly winged; those of the ray surrounded with a broad, torn membrane, on both sides slightly convex, rough towards the summit.

HAB. On the highest summits of the Australian Alps, in grassy or peaty soil; for instance, on Mount Buller and the Cobboras Mountains.

A remarkable species, often tinged with a purple hue.

106. Brachycome *multicaulis*, F. Muell.; suffruticose, somewhat scabrous; stems numerous, ascending, foliate, simple or a little branched, naked towards the summit; leaves nearly sessile, pinnatifid, their segments linear, acute, close to each other, short in the upper leaves; scales of the involucre cuneate-oblong, somewhat scabrous, blunt, with membranaceous ciliate-torn margins; receptacle convex; achenia compressed, oblong-cuneate, with a very short pappus, those of the disc with very narrow hardly ciliolate wings, those of the ray with broader somewhat callose margins, rough towards the summit.

HAB. On the highest cliffs of Mount Buller.

107. Brachycome *chrysoglossa*, F. Muell.; perennial, glandulously pubescent; leaves only on the lower part of the stem, oblong-cuneate, at the top rounded or truncate, with a few notches; scales of the involucre blunt, obovate, with a broad membranaceous torn-ciliate margin, glandulous on the back; ray golden-coloured; achenium tawny-yellow, margined, compressed, surrounded by a broad, irregularly petinate-ciliate wing, thickened and somewhat scabrous on the disc; pappus conspicuous.

HAB. In the Mallee Scrub towards the north-western boundaries of the colony.

Remarkable for the colour of its flower-ray, otherwise closely approaching in affinity to *B. calocarpa.*

108. Angianthus *brachypappus*, F. Muell.; glomerules tapering gradually into the base, at last brownish; pappus ciliate-torn, shorter than the achenium, or producing a single hair, which is not plumose at the summit, and shorter than the corolla.

Hab. On barren plains near Swanhill.

Although the above notes appear to offer all distinctive marks between this and *A. tomentosus*, the only hitherto known species, yet this new one may be easily recognized by them.

109. Chrysocoryne (Sect. Bisquama) *tenella*, F. Muell.; dwarf; leaves thick, linear, upwards broader; glomerules short, cylindrical, blunt, golden-yellow; heads with two flowers; scales of the involucre two, glabrous, naked or but imperfectly ciliolate; corolla three-toothed, short exserted.

Hab. In flats subject to inundations by winter-rains, between the Long Lake and the Fountain, on Spencer's Gulf, *C. Wilhelmi.*

An *Olax* (*O. obcordata*), which grows conjointly with this plant, presents a similar approach to *O. Phyllanthi* from Western Australia, as this *Chrysocoryne* to *C. pusilla.*

110. Rutidosis *leiolepis*, F. Muell.; stems numerous, dwarf, simple, adscending, tomentose, rising from a woody rhizome; leaves broad-linear, with revolute margin, at last smooth, the radical ones crowded with a woolly clasping petiole; flower-heads terminal, solitary, hemispherical; scales of the involucre in several rows, pale, smooth; the outer ones broad-ovate, blunt, the inner ones lanceolate; achenia oblong-ovate, truncate; scales of the pappus eleven to thirteen, oblong-spathulate.

Hab. On rocks along the Snowy River, and near it on the bare mountainous pastures.

The subgenus established on this plant connects *Rutidochlamys* closely with *Rutidosis.*

111. Trineuron *nivigenum*, F. Muell.; leaves linear, blunt, indistinctly three- or five-nerved, on a clasping, fimbriate petiole; heads many-flowered; scales of the involucre fourteen to sixteen, oblong, with three pellucid nerves; female flowers three- or four-toothed, their style very short bilobed; style of the sterile flowers undivided; achenia indistinctly tetragonous, oblong-cuneate, with but slightly thickened angles.

Hab. On grassy or gravelly places in the Munyang Mountains, irrigated by the melting glaciers (5–6000 feet).

Intermediate between *T. spathulatum* from the Antarctic Islands, and *T. pusillum* from New Zealand.

112. Hæckeria *ozothamnoides*, F. Muell.; branches scantily woolly; leaves linear, mucronate, with revolute margin, beneath grey-tomentose; heads five- to seven-flowered; all the scales of the involucre upwards pale yellow.

Hab. In dry places on Barker's Creek, on the Upper Murray and Snowy River.

The species upon which I founded the genus originally may be briefly thus characterized:—Hæckeria *cassiniæformis*, F. Muell.; leaves semiterete, blunt, as well as the branches scabrous; heads two- or three-flowered; interior scales of the involucre upwards white.

(*To be continued.*)

BOTANICAL INFORMATION.

The Mammoth Tree.

For a few weeks lately a portion of this truly wonderful tree (*Wellingtonia gigantea* of Dr. Lindley, *Washingtonia gigantea* of the Californians, *Sequoia gigantea* of Dr. Torrey) has been privately exhibited in the great room of the Philharmonic Society, Newman-street, Oxford-street. This particular tree is the one noticed in our account of the several giants which constitute the "Mammoth-Tree Grove" (see p. 106 of our present volume). It has been stripped of its bark at great labour and expense by Mr. Trask and his assistants to a height of 116 feet from the base; and the portion at present brought over by the intelligent proprietor, Geo. L. Trask, Esq., M.A., consists of sections of the bark (from 18 to 22 inches thick!) taken from the trunk 40 feet from the base. These sections, all numbered, are placed in their proper position, and exactly represent that portion of the trunk from which they are taken, and certainly nothing of the kind has ever been seen in Europe before. The diameter is here 22 feet (at the base 30 feet). A door is formed and the interior presents a nearly circular apartment, 20 feet wide. The colour of

the bark is a rich cinnamon-brown, not unlike that of some of the varieties of the Scotch Pine in its native hills, but their colour is varied by a sprinkling of a rich golden-coloured lichen, which grows naturally on the trunk (the *Evernia vulpina*, Ach.); and, what is remarkable, the same species of Lichen is common on the trunks of Pines in Switzerland.

We believe there can be but one opinion among all who have been privileged to see this monster of the vegetable creation, viz. that it is one of the most wonderful natural vegetable productions that has ever been brought to Europe; and it is earnestly hoped the spirited proprietor will give instructions for the remainder of the bark (now at New York) to be sent over, and that he will find a place, in or about London, suited to the *public* exhibition of the entire length (116 feet), as well as the entire base. The whole tree, still standing and living in its native mountains, measures 327 feet in height, and the circumference is 90 feet!

NOTICES OF BOOKS.

Géographie Botanique Raisonnée, *ou Exposition des Faits principaux et des Lois concernant la Distribution Géographique des Plantes de l'époque actuelle; par* M. Alph. de Candolle. 2 vols. 8vo. Paris.

(*Continued from p.* 121.)

The theory of the origin of races is well discussed, though somewhat too lengthily, and is illustrated by the supposed case of a species, consisting of eight varieties, inhabiting a large island, the var. α and var. θ of which species are extremely dissimilar. Geological changes may break the island up into an archipelago of eight islets, of which each may retain but one or a few of the varieties; further geological conditions may destroy all the islands but those containing vars. α and θ, and the elapsed time may have sufficed to render these permanent races, which hence have become undistinguishable from species. Nor does the difficulty end here: the two vars. α and θ, which would perhaps in our day be ranked only as doubtful species, will, if they continue segregated, become more and more confirmed in their differences, and consequently be better entitled to rank as species. The above idea is not new, and may be greatly extended; thus we may imagine that

other geological conditions may, by extending one islet in one direction and the other in an opposite one, whilst their contiguous shores are depressed, remove the two islets and their induced races to indefinitely great distances; and that these changes may be accompanied with others of climate that may alter the appearance of the species beyond all probability of their common specific origin ever being even so far assumed as to suggest experiments to prove them one.

The admission of such facts (and who can deny them being both philosophical in the abstract, and capable of absolute proof, to some degree at least, under existing conditions?) does appear to render the attempt to arrive at any definite conclusion as to the limits of many species a desperate one. All this M. de Candolle feels and candidly admits, and from the very horns of the dilemma he proposes that a position may be taken up, upon the ground that permanence of form amongst wild plants has been proved during the short period of our experience, and upon the grand point that many existing species have not changed since the days of the ancient Egyptians, or since the more ancient period of the deposits of turf, etc.*

That this fact however leads to no practical result, M. de Candolle admits, because it is impossible to ascertain the state of species during many thousands of years; because of the uncertainty of the period to which we are carried back, and because induced forms (*formes dérivées*—races) are probably less numerous than original specific forms. The last point is regarded as very important, and the facts adduced by M. de Candolle as illustrating it are extremely valuable.

In the first place, he says that races produced by cultivation never so far depart from their original form as to be mistaken for different genera.† Thus *Brassica oleracea*, *campestris*, and *Napus* have pro-

* All naturalists however will not go even so far as this; they will deny that the Egyptian monuments and relics, and the fragmentary remains of plants in peat bogs, etc. afford even tolerable evidence of specific identity. Let any unprejudiced naturalist examine the minute often solitary characters upon which so many species of existing plants are founded, and then ask himself how it is possible to pronounce two plants to be specifically identical without at least having flowers and fruit and leaves of both? Can any one doubt this, who will only take up two or three of the best European Floras, and see what differences of opinion there are as to what are species and what not, amongst our commonest and biggest forest-trees,—oaks, elms, pines, birches, etc.? Even habit of growth is sometimes insisted on as in itself proof of specific difference!

† This is assuming genera to be natural and not conventional groups of species. There are no doubt cultivated forms of plants that afford, abstractedly, good generic characters.

duced a multiplicity of hereditary races, but the characters of their flowers and fruit are still those of *Brassica*. So with the races of *Triticum*, these may differ in the number of seeds and their form, and in their awns (beards), but no one has proposed to make a new genus of any of them.*

The fact that isolation is one of the conditions that leads most usually to the subdivision of species or formation of subspecies, if taken together with another fact, that the majority of analogous species are aggregated within more or less contracted areas, appears to M. de Candolle to militate against the hypothesis that time and isolation may account for the origin of species. Thus the hundreds of Cape Heaths, he says, cannot have owed their origin to geographical isolation, for we cannot conceive causes that would, after their segregation, have aggregated them again. The genera *Stylidium*, *Solanum*, *Aster*, *Astragalus*, *Cistus*, and *Linaria*† are quoted as affording parallel cases.

Upon the whole M. de Candolle inclines to admit two modes of originating new specific forms: the one derivative, which is very rare and confined to species that are very closely allied‡ but geographically sundered; the other an original creation, "mode par une formation propre," which certainly obtains for the immense majority of species.

* Here again there is room for much question. If the legitimate consequences of this are pursued, the genera of Grasses must be reduced to very few, and a number of small genera around *Triticum* itself must be eliminated. We do not admit bearded and beardless Wheats to be different genera, because we know their history too well, and not because they do not in the abstract present good generic characters; for there are many genera of Grasses contradistinguished by all botanists by those very characters, and which present species that vary so that they may be referred indiscriminately to any of them.

† The very same class of facts is adduced, by some advocates, of the development of many species out of one, in support of their view; and, in conjunction with the fact that all these genera, except perhaps *Stylidium*, present heaps of scarcely distinguishable species as subspecies or races, are no doubt apparently strongly in support of it; to which may be added, in the case of *Cistus* and *Erica*, the facility of hybridization and impossibility of tracing the parents of many of our garden hybrids. If instead of citing those foreign genera we take some more familiar ones, also presenting groups of geographically aggregated species, as *Rosa*, *Rubus*, *Salix*, about the limits of whose species no botanists are agreed, the case will appear as strongly in favour of aggregation as of isolation in being an agent in producing species or subspecies. Even time does not seem to be necessary in some cases, for species-mongers find new species of Willows in modern osier-beds and new Brambles by roadsides.

‡ It will be argued by many that if the derivative origin is granted to any species, it may, with no violence to nature, be extended to all: both time and isolation being necessary, it is obvious that these elements may in some degree be complementary to one another. Isolation is in its operation synonymous with altered surround-

These considerations lead M. de Candolle to a still more purely hypothetical subject, viz. the greater variability of species in certain geological epochs or during certain epochs of the existence of the species.

Against the idea that species are more variable at certain times than at others, M. de Candolle urges that it is to revolutions of the earth's surface that we must look for causes that would effect sudden changes of species, and that these revolutions can only be exaggerations of operations now in action, and which do not produce the slightest effect on the majority of existing species.

M. Lecoq's theory, that species like individuals have a definite period of development, followed by a stationary one, and that again by extinction, is opposed by M. de Candolle, firstly, on the ground that it is unphilosophical to confound a complex with a simple phenomenon. According to Isidore G. St. Hilaire and many other naturalists, the so-called species of any epoch are all races derived from the fewer pre-existing races; and M. de Candolle considers the fact as proven, that a race once established is itself very variable, citing the opinion of M. Louis Vilmorin, who has shown satisfactorily that to produce a race the constitution of the species operated upon must be shaken (*ébranlée*, *affolée*), after which it becomes more amenable to the experimenter. Now, according to Lecoq, newly created forms are more variable than the same are at a later period, and those genera that contain a great many indeterminable forms (*Rosa*, *Salix*, *Viola*, *Polygonum*, *Thalictrum*, *Rubus*, etc.) may hence be assumed to be in a young or partially developed state.* These ideas are combated by M. de Candolle, who shows that they are founded mainly on a preconceived idea of what is to be considered a species and what not; that, for example, the botanist who sees only five or six distinct species of *Rubus*, each of which varies infinitely, looks upon the case in a totally different light

ing conditions; and as greatly altered conditions are often seen suddenly to induce changes in species, so may slightly altered conditions produce equal changes, if time enough be allowed for their operation. Grant the first step, say the opponents of M. de Candolle's hypothesis, and allow the formation of the race or subspecies, and a repetition of the conditions may well so increase the amount of change as to produce a species, a genus, and so forth.

* Carrying out this view will infallibly lead to the conclusion that the majority of plants are new creations; for there is not a single large genus that is not involved, and the exotic ones to an extent which few botanists have an adequate idea of. It is easy to draw lines of distinction between single herbarium specimens of these; but as our collections increase the previously well-defined species of large genera become more and more difficult of discrimination by the intercalation of osculant varieties, races, and species.

from another who considers that twice ten times that number of species should be maintained. M. de Candolle also shows that the degree of variability of the genera is to a great extent in direct proportion to the antiquity M. Lecoq assigns to them, and in which relative scale of antiquity M. de Candolle agrees, namely, that the oldest are Cryptogams, next Monocotyledons, and lastly Dicotyledons.

The purely hypothetical question of the origin of existing species is remarkably well treated, and is also illustrated as fully as it is capable of being, which however is not saying much. The first (or the several first) organic beings were either elaborated from inorganic matter in accordance with some physical law unknown to us, or they were created out of nothing, or out of inorganic matter, by a higher power not residing in matter ("par une cause supérieure étrangère à la nature"). Each of these hypotheses, he adds, demands a something which we can neither see, feel, nor even comprehend.

Some naturalists have sought to escape the difficulty, says M. de Candolle, by the doctrine of progressive development, an hypothesis which does not do away with the necessity of a supernatural cause to account for the origin of species; to which he adds, that this is a subject upon which we know nothing. It marks the boundary between a science of observation and one of speculation; it however branches off into three others which are more capable of study.

1. On the primitive centres of vegetation he arrives at three conclusions:—that the region in which a species originated cannot be exactly determined; that species have originated at numerous different regions; that some of these regions may be indicated with a certain degree of probability, but not with precision, on account of the interchange of species and the probable disappearance of some of the regions.

2. The creation of species has probably been successive. This all existing facts in both geology and botany tend to show.

3. With regard to the hypotheses that species are created as single individuals or in single pairs, or that many individuals of each were created at once, the former appears to M. de Candolle to be too seductive from its simplicity, and adds that it has led many authors into a palpable contradiction. He says that almost all the advocates* of a single

* M. de Candolle is here in error; amongst British naturalists at any rate this opinion does not prevail. After all, it may demand no greater stretch of imagination to fancy the creation of a full-grown tree, with its misletoe attached, than one without it; or of a tree rather than of its seed.

origin for each species have admitted a simultaneous creation, if not of the whole world, at least of all vegetables, and of all animals but man, and in doing so they have lost sight of the fact that some plants are parasitic on others, and some require the shade of others.

The strongest objection however to the creation of single individuals* is, in M. de Candolle's opinion, the disconnected species alluded to at p. 116, whose individuals he supposes to have originated at the spots where they are now found, or at any rate at localities nearer to those spots than they are to one another.

Under the head of Duration of Species and of Races, the subject of their disappearance is discussed; the absolute extinction of them M. de Candolle appears to think is sometimes too hastily assumed, because relays of seeds lie buried in the soil, etc.†

Chapter 12. On the Geographical Habitats of Genera: the Limits and Form of their Habitats.

In the preliminary discussion of M. de Candolle maintains the view which he has always held (in opposition to the majority of botanists) that genera are even more naturally limited groups than species.‡ The

* The admission of many centres of creation for each species opens the door to the admission of many other hypotheses, all tending to disprove the permanent distinction of species; for instance, if species are created at two different spots, they will, it is only reasonable to suppose, appear in many cases as two races, and if in many spots, we may have as many races originally created, whence race and species become practically convertible terms from the very beginning of the creation of the species. Again, if species are successively created, why may not individuals of the species be also? and if this be granted, the subject of distribution is hopelessly complicated. To the progress of modern geology such admissions are fatal.

† The possibility of species being thus preserved when to all appearance lost is no doubt true; but in reality it is not worth alluding to as a conservative agent of any appreciable effect. M. de Candolle alludes to it especially in reference to the asserted extinction of St. Helena species. The forests of this islet (extending over several thousand acres) were, it is well known, destroyed, and with them a native vegetation that may fairly be assumed to have numbered several hundred species. Of this native vegetation now very few species remain, and these are either confined to places where the forest was not destroyed, or are plants that grew where it never existed. If the seeds of the others had remained alive in the soil, there would surely have been some renovation of the vegetation from the old; but there has been none. Since the island was first botanized, half a century ago, no new plant has appeared on it, and every old one, without exception, is getting rarer; some of them indeed have become totally extinct. Hundreds of acres of St. Helena soil are disturbed for gardens, plantations, and agricultural operations, and numberless opportunities are thus given for any buried seeds to grow and flourish, but nothing of the kind has ever taken place. The wild plants of the remaining woods, and the trees forming those woods, do not even spread into the artificial shrubberies and plantations on whose outskirts they are abundant.

‡ In this opinion we do not agree; neither do we admit the premises from which M. de Candolle draws his conclusions, as that an intelligent observer who is no

subject itself, of the geographic limits of genera, can hardly be said to be discussed in the Chapter; but our author appears to intimate that their areas are more restricted than we should have supposed them to be.

(*To be continued.*)

The FLOWERING PLANTS *and* FERNS *of* GREAT BRITAIN: *an Attempt to Classify them according to their Geognostic Relations; by* JOHN GILBERT BAKER.

This, which is a paper read at Glasgow, before the twenty-fifth meeting of the British Association with additions, is an attempt, first, to arrange the British flowering plants and Ferns according to their predilection for certain soils; and secondly, to determine the amount of change that may be effected in species by the soil in which they grow. The Author states that his sketch is based upon the model of the plan pursued in Thurmann's 'Essai de Phytostatique appliqué à la Chaîne du Jura,' and adds, that his principal inducement is the desire to suggest inquiry relative to the subject amongst more experienced botanists and geologists than himself.

The attempt is a very meritorious one, and deserves more at the hands of British botanists than is implied by the comments made by those who heard it read at the time, and which Mr. Baker has very candidly appended to his Essay. The Author starts with considering the soils as being primarily divisible into two classes,—those that disintegrate easily, and yield an abundant superficial, usually damp detritus, and those which disintegrate with difficulty, and yield a scanty, dry detritus. Every species is considered (and no doubt truly) as being more or less adapted to flourish upon various kinds of soil, just as it is more or less adapted to inhabit various climates. Further, under equal climatic conditions, different species will always more or less confine themselves to one or the other class of soil; but with change of climate, under equal conditions of soil, certain species disappear, and the remainder are, upon the whole, less restricted to one kind of soil. Thus, passing from a dry climate to a moist one, under equal conditions of soil, it is obvious not only that the dry-climate plants will dis-

botanist recognizes genera before he does species; it might indeed be argued, with as much show of reason, that if genera are not more natural than species, the latter are not natural at all! so arbitrary are their limits throughout whole large Natural Orders.

appear, but that those which in the dry climate only grew on the wet soil will, in the wet climate, grow also on the dry soil.

From these considerations Mr. Baker proceeds to sketch out the surface of Great Britain as characterized by its geological structure, and (as is assumed) its consequent superficial soil, of which he recognizes six principal modifications; for these we must refer to his Essay, with the casual remark that we find no allusion to the phenomena of the "drift," which, we believe, in many places spreads the detritus of rocks easily disintegrated over immense surfaces, coloured in our geological maps as having a very opposite subjacent rock, and which, if we are right in our supposition, must introduce a disturbing element into Mr. Baker's calculations.

A co-ordination of these data with Watson's botanical provinces and zones follows, from which the Author proceeds to classify his facts, arranging the British plants under thirteen heads, of which the most important to notice are those including—1, the species common to all soils (700 sp.); 2, those having a marked preference for soils disintegrated with difficulty (92 sp.); and 3, those with a marked preference for soils not easily disintegrated (144 sp.). The other divisions include plants that, for special reasons, are not included under any of the above: there are modifications of these heads; as, Maritime, Hibernian and Sarnian, local or dubious, agricultural aliens and introductions, horticultural aliens and introductions.

To many of the species thus ranked we might take exception, as with regard to the *Hellebori*, *Clematis*, *Atropa*, *Sesleria*, having a marked preference to soils with difficulty disintegrated, seeing that some of these flourish in the deep beds of stiff clayey "drift" in Suffolk and elsewhere, and the *Sesleria* on schist rocks in some parts of Scotland; as also to the introduction of such water-plants as *Isnardia*, *Elatine*, and other absolute aquatics, into the list of species supposed to have a marked preference for soils easily disintegrated; and though in favour of generalizing upon strong indications of preference for certain soils or climates, in subjects like this, where absolute data are almost inaccessible, yet we cannot help remarking that of 1615 species only 92 are quoted as very strongly indicative of one kind of soil, and 144 of the other, numbers which might be considerably reduced without violence to facts.

Lastly, the Author opens the most important and curious question, the modification of specific type through the influence of the soil, and

adduces *Viola hirta* and *odorata* as a case in point. Those who have studied the genus *Viola* as a whole, will not be surprised at Mr. Baker's conjecture that the two cited may be varieties of one, and every one will appreciate the value of his observations on the gradual change of habit in each produced by the soil it grows upon. This is a subject which we are glad to perceive Mr. Baker is pursuing further, and we cannot conceive a more interesting or suggestive one, or one upon which the time and acumen of a good local observer can be better expended.

With regard to the main question, the preference of species for soils, we doubt if it admits of much greater illustration at the hands of British botanists than Mr. Baker has given; it requires that the whole trans-Britannic range of each species be known before any single datum can be considered absolute. The chemical nature of the soil has also probably some effect (though very slight indeed), as Planchon's observations, published in the 'Bulletin de la Société Botanique de France,'* would seem to indicate.

We cannot dismiss Mr. Baker's little Essay without hearty commendation for the energy with which he has pursued a very difficult inquiry, and would add a hint that the subject is somewhat obscured by the use of compound words that are not euphonious. Such terms as Calcareo-eugeogenous and Psammo-dysgeogenous (invented, we believe, by Thurmann) have the merit of being explicit, but it is always a question whether, when a subject is complicated, it is not better to avoid introducing into it any new terms that are not both short and significant.

E. M. C.: *Popular* GEOGRAPHY *of* PLANTS, *or a Botanical Excursion round the World. Edited by* CHAS. DAUBENY, M.D., F.R.S., etc., Professor of Botany and Rural Economy in the University of Oxford. Royal 16mo, with coloured plates. London, 1855.

The present volume forms one of Mr. Lovell Reeve's series of Popular Natural History, which cannot fail to lead the reader on to the less popular, but more philosophical, writers upon this interesting subject. The excellent Dr. Daubeny has kindly taken an interest in the publication, and has prefaced it by a well-written essay of twenty-five pages,

* Sur la Végétation spéciale des Dolomies dans les Départements du Gard et de l'Hérault, par J. E. Planchon.

and concludes it by remarking that, "without meaning to make himself responsible for the accuracy of all the details introduced into its pages, I am ready to bear my humble testimony to the general truthfulness of the descriptions given, and may therefore venture to recommend the book as one likely to supply a void in the popular scientific literature of the day; inasmuch as the subject is therein treated, on the one hand, in a less perfunctory manner than is commonly done in works embracing the entire extent of Physical Geography, and, on the other, on a less dry and technical plan than appears to have been hitherto the rule in the larger treatises on the Geography of Plants which have come before the public."

The general plan or arrangement of the work is that of Meyen's 'Botanical Geography,' and that has supplied the framework of the greater part, the botanical details being generally derived from other sources, and these sources are fully acknowledged in their appropriate places or in the Author's Preface. The useful diagrams and maps are adapted from the best authorities, as are the characteristic features of vegetation in the plates; but these plates, being executed by the same artist as those in Dr. Seemann's book* lately noticed, are certainly no improvement on the originals. The *Umbelliferæ* (Tab. IV.), the *Screw-Pine* (Tab. IX.), the *Tara Plant* (Tab. X.), and *Bread-fruit* (Tab. XII.), have not the shadow of a resemblance to the plants themselves. Here however the plates are placed opposite their respective descriptions.

The work is divided into twelve heads or chapters, and the vegetation of a certain zone is briefly treated of under each:—1. The *Polar Zone*, including all the lands above 72° of lat. 2. The *Arctic* (and *Antarctic*) *Zone*, between the Arctic (and Antarctic) Circle and 72°. 3. The *Subarctic*, from 58° to the last-mentioned zone. 4. The *Colder Temperate Zone*, from 45° to 58° of latitude. 5. The *Warmer Temperate Zone*, from 34° to 45° of latitude. 6. The *Subtropical Zone*, from the Tropics to 34° of latitude. 7. The *Tropical Zone*, from 15° of lat. to the Tropics. 8. The *Equatorial Zone*, including 15° of lat. on each side the equator. The 9th and last chapter is devoted to "the distribution of British Plants, and their relations with the different Floras of the Continent," on which subject the writings of Professor Forbes have been the Author's chief guide.

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* Popular History of Palms.

W Fitch del. et lith.

Definitions of Rare or hitherto Undescribed AUSTRALIAN PLANTS, *chiefly collected within the boundaries of the Colony of* Victoria; *by* Dr. FERDINAND MUELLER, Government Botanist for the Colony of Victoria.

(*Continuèd from p.* 150.)

Antennaria, *Gærtner*. (*Sect.* Actina.)

Scales of the involucre radiating. Heads of the fertile plants with several rows of female flowers in circumference, and with hermaphrodite ones in the centre. Heads of the sterile plants with only hermaphrodite flowers, a few rarely fertile. Pappus at the extremity clavellate, with the exception of that of the female flowers, which is not thickened.

113. Antennaria *uniceps*, F. Muell.; depressed, rooting, densely foliate; leaves subcoriaceous, somewhat rigid, channelled-linear, acute mucronulate, glabrous; petioles clasping, scarious, woolly fringed; flower-heads solitary, almost sessile; scales of the involucre glabrous, somewhat red, at the base green, the outer ones ovate, inner ones narrow-lanceolate, not radiating; pappus of the sterile flower-heads scabrous, very slightly thickened at the apex.

HAB. On gravelly places near springs, or such as are subject to inundations in the Munyang Mountains (5–6000 feet).

A small tufted herb, of some resemblance with *Raoulia tenuicaulis*. The fertile flowers are yet unknown.

114. Antennaria *nubigena*,* F. Muell.; stems herbaceous, creeping, corymbose, short, upright, cæspitose; leaves dense, flat, oblong or ovate-cuneate, somewhat acute, entire, spreading, clasping at the base, one-nerved, on both sides covered with a thin, appressed, silver-grey toment; flower-heads terminal, generally solitary, sessile; involucres hemispherico-campanulate; its scales smooth, acute, entire, the middle ones lanceolate-oblong, white at the top; achenia tereti-oblong, scabrous.

HAB. On the rocky summits of the Cobboras Mountains, covered nearly throughout the year with snow.

A truly alpine species, like most others of this interesting genus, formerly not found represented in Australia, unless erroneously referred by Candolle to *Gnaphalium* (as *G. catipes*).

* *Raoulia Tasmanica*, H.f., and *Gnaphalium catipes*, DC.—ED.

115. Senecio *vagus*, F. Muell.; glabrous; stem suffruticose, with spreading branches; inferior leaves large, pinnatisected, with generally two pairs of segments, which are long-lanceolate, acute, remotely and grossly toothed; the terminal segment very large, trifid and toothed or laciniated; upper leaves lanceolate, entire or trifid, tapering into a short petiole; flower-heads panicled, with a conspicuous peduncle, and large lanceolate-linear bracteas; scales of the almost bell-shaped involucre ten to twelve, equal in length to the disc, acute, on the margin scarious, on the back with black papills; ray spreading; achenia glabrous, angulate, furrowed, transversely rough, half as long as the pappus.

Hab. In shady moist valleys of the Dandenong Ranges, of Mount Disappointment, and on the Delatite.

A smaller variety (*alpestris*), with thicker, more dissected leaves, occurs on the rocky summit of Mount Buller.

XXIX. Stylideæ.

116. Coleostylis *Sonderi*, F. Muell.; all over glandulously pilose; stem simple or branched at the top, foliate; leaves alternate, roundish heart-shaped or rhomboid, the uppermost sessile, the rest petiolate; pedicels axillary, solitary, forming a terminal corymb; basis of the corolla tubulose.

Hab. On wet places near the Violet Creek, found by Mr. C. Wilhelmi.

A neat little plant of the habit of *C. Preissii*.

117. Stylidium (Sect. *Tolypangium*) *soboliferum*, F. Muell.; soboles numerous, thread-like; leaves all radical, crowded together in a dense globule, nearly terete, glabrous, bearing a terminal hair; interstinct scales wanting; racemes few-flowered, corymbose or panicled, together with the scape glandulously pilose; calyx five-parted; lip with appendages; faux of the corolla naked.

Hab. In sandy, stony declivities of the Grampians, the Serra, and the Victoria Ranges.

An elegant little plant, quite of the habit of a *Saxifraga*. It is nearest related to *S. piliferum*, and in some degree also to *S. saxifragoides* and *S. assimile*.

XXX. Goodeniaceæ.

118. Velleya *connata*,* F. Muell.; high, glaucous, smooth; stem

* This is probably the *Velleya panduræformis* of Allan Cunningham.—Ed.

upright, dichotomous, with bearded axils; leaves all radical, elongate-lanceolate, one-nerved, entire, contracted in a petiole of equal length; bracts very large, almost deltoid, acute, half concrete, entire; segments of the calyx lanceolate and ovate, acuminate; style villose; seeds densely punctate, surrounded by a broad wing.

HAB. On scrubby sand-hills towards the junction of the Murray and Murrumbidgee.

This highly curious plant also possesses the tonic bitterness which I discovered in numerous species of *Goodeniaceæ*.

XXXI. Epacrideæ.

119. Leucopogon (Sect. *Brachystachys*) *Macraei*, F. Muell.; tall, much branched; branchlets very little spreading, firm, velvety; leaves spreading, ovate or from a round base lanceolate, stalked, flat, not mucronate, glabrous, above shining, in front ciliolate; spikes terminal or below the apex, few-flowered, soon erect; calyx and bracteoles blunt, ciliolated; tube of the corolla hardly longer than the calyx; anthers half-exserted; style glabrous, enclosed; drupe globose, red, generally four-celled, nearly dry.

HAB. In valleys on the sources of the Mitta Mitta, near Mount Hotham and Mount La Trobe, as also along the torrents of the Cobboras Mountains (5–6000 feet).

This fine species is dedicated to Andrew M'Crae, Esq., as an acknowledgment for much support received from him in my travels.

120. Decaspora *Clarkei*, F. Muell.; stems short, diffused; branchlets slightly downy; leaves thinly coriaceous, flat, oblong-lanceolate, acutish, three- or five-nerved, without a mucro, very much longer than the petiole, in front scabrous; spikes few-flowered, corymbose, as long as or longer than the leaves; faux of the large corolla bearded.

HAB. In shady ravines at Mount Wellington, half-buried in decaying leaves; very rare.

This elegant little shrub bears the name of Captain Andrew Clarke, the worthy President of the Philosophical Society, to whom the author is under manifold great obligations for promoting his researches.

The four other species are endemic Tasmanian ones. The large bluish berries of this are eatable.

XXXII. Oleaceæ.

121. Notelæa *venosa*, F. Muell.; arborescent; branchlets nearly te-

rete, glabrous; leaves large, opaque, ovate or elongate-lanceolate, acuminate, gradually narrowed into the petiole, on both sides perfectly smooth and net-veined, not or indistinctly dotted, with entire or imperfectly repand margin; racemes axillary or lateral, when flowering at least three times shorter than the leaves; teeth of the calyx unequal; stigma subsessile, bifid; drupes large ovate.

Hab. In woods of the eastern part of Gipps' Land.

It shows affinity as well to *N. laurifolia* from New Zealand, as to *N. reticulata* from eastern sub-tropical Australia.

XXXIII. Loganiaceæ.

122. Mitrasacme (Sect. *Lysigyne*) *distylis*, F. Muell.; annual, minute, glabrous; stem upright, simple or a little branched, smooth; leaves oblong-linear, somewhat carnulent; pedicels axillary and terminal, setaceous, solitary, rarely two or three together, at least twice as long as the leaves; calyx bell-shaped, very short, bilobed, not excelled in length by the corolla; styles separated; capsule enclosed; seeds net-veined.

Hab. Around swamps near Mount William.

In stature resembling *Mitrasacme paradoxa*, but from this as well as all the other species widely different in its disjoint styles.

XXXIV. Gentianeæ.

123. Sebæa (§ Phyllocalyx) *albidiflora*, F. Muell.; leaves somewhat fleshy, broad-ovate, the lower ones roundish, blunt, almost nerveless; sepals indistinctly keeled, oblong, blunt, winged at the base; cyme simple, close; lobes of the corolla four, whitish, ovate-oblong, blunt, half as long as the tube; style short-exserted, with a bifid stigma.

Hab. In saline pastures from Port Phillip to Port Fairy, and at George Town in Tasmania.

Approaches next in its characters to *S. albens*, from South Africa.

124. Limnanthemum *crenatum*, F. Muell.; leaves cordate-orbiculate, crenate, obsoletely palmatinerved, above even, beneath densely glandulose; segments of the calyx narrow-lanceolate, less than half as long as the corolla, exceeding but little the length of the capsule; segments of the yellow corolla on the margin and orifice fimbriate, inside longitudinally broad-cristate; style thick, abbreviate; stigma with five lacerate wings; hypogynous glands fimbriate; capsule polyspermous; seeds ovate, lævigate, hardly keeled.

Hab. In tranquil bends of the Murray River, Murrumbidgee, and Mitta Mitta, and in the nearest lakes and lagoons.

A most handsome, and, with regard to its crenate leaves and the structure of the stigma, equally singular species.

XXXV. Solanaceæ.

125. Solanum *vescum*, F. Muell.; fruticose, unarmed, erect, smooth; twigs winged; leaves large, sessile, long-lanceolate, undivided or furnished towards the middle, on both sides, with one or two lanceolate segments; calyx of the corymbose flowers to the middle five-cleft, with thick, subdeltoid, cuspidate, unkeeled lobes; corolla smooth, somewhat folded, violaceous, almost bell-shaped, with five very short lobes; filaments thread-like, equal in length to the yellow, oblong anthers; berries large, green, nearly globose.

Hab. The Gunyang has been found, as far as I know, only yet in Gipps' Land, where it occurs on sand-ridges around Lake Wellington, on the coast towards the mouth of the Snowy River, on grassy hills at the Tambo, the Nicholson's River, and Clifton's Morass, on the rich shady banks of the Latrobe River, and near the Buchan River.

A shrub, with spreading branches, sometimes more than six feet high, but already in the first year producing flowers and fruits, by which means the plant appears then to be herbaceous. Branches woody, covered with a brownish-grey, wrinkled, and fissured bark. Leaves decurring along the twigs, hardly shining, beneath a little paler, generally somewhat scabrous; middle rib of the leaves and their segments above sharply prominent, beneath yet more protruding, and these semiterete; the lateral nerves numerous, patent, and conjoined by veins. Corymbs axillary, few-flowered, either solitary or twin, sometimes cymose, sometimes racemose. Peduncles terete, often slightly angulate, from 1–2 inches long, rarely wanting. Pedicels as long as the peduncles, terete, solitary, gradually passing into the calyx. Calyx nearly campanulate, in age carnulent; the teeth at length 2–3 lines long. Corolla tender, lilac-blue, nearly all times of an equal colour, but rarely outside with exception of the wing-like part greenish, undulate at the margin; the lobes either rounded or emarginate. Stamens considerably shorter than the corolla; filaments very thin; anthers 1½ line long, opening at the apex, but also bursting more or less longitudinally. Style white, longer than the stamens. Stigma capitellate, bilobed.

Berries when perfectly ripe pulpy, sometimes above 1 inch long. Seeds ovate-roundish, compressed, with a grey net-like tissue.

126. Solanum *lacunarium*, F. Muell.; armed all over with setaceous-subulate, straight prickles; stem dwarf, suffruticose, branched; leaves petiolate, in circumference oblong-ovate, sinuate-pinnatifid, above conspersed with stellate hair, at length calvescent, beneath as well as the branches covered with a thin grey toment; lobes of the leaves oblong, rounded-blunt, with entire margin; peduncles terminal, two- to six-flowered, aculeate; segments of the calyx acutish, deltoid-lanceolate; anthers yellow.

HAB. In lagoons, which are dry during the summer season, near the junction of the River Darling and Murray.

It differs from *Solanum cinereum* (R. Br. Prodr. i. 446), the only one to which it bears similarity, in its blunt, entire leaf-lobes, which are, together with flowers and berries, considerably smaller, by almost constantly armed peduncles and pedicels, and by hardly cuspidate segments of the calyx.

127. Solanum *pulchellum*, F. Muell.; unarmed; stems procumbent, suffruticose; leaves on somewhat long petioles, ovate or narrow-oblong, blunt, repand, entire, above pale green, laxly tomentellous, below clothed with a shineless, thin, grey toment; peduncles two- to five-flowered, generally surpassing the length of the petiole; calyx half as long as the corolla, carinulate, with triangular, acuminate segments; anthers yellow, slightly attenuate, surpassed in length by the style.

HAB. Along the Wimmera, Avoca, and Murray Rivers; thence through the desert-country as far as Lake Torrens, Spencer's and St. Vincent Gulfs.

Allied to *Solanum dianthophorum* (Dunal Sol. 183), and to an undescribed species discovered in Central Australia by Captain Sturt, of which I subjoin the definition:—

128. Solanum *Sturtianum*, F. Muell.; stem upright, fruticose, scantily armed with short, acicular prickles; leaves on somewhat long petioles, lanceolate-oblong, blunt, entire, unarmed, above glabrescent, beneath clothed with a very thin toment; peduncles three- to five-flowered, generally surpassing the length of the petiole; calyx much shorter than the corolla, with triangular, acute teeth; anthers yellow, attenuate.

Another species, brought from the interior of this island-continent by the same intrepid traveller, might be characterized as follows:—

129. Solanum *oligacanthum*, F. Muell.; stem upright, fruticose; branches beset with distantly scattered setaceo-subulate prickles; leaves small, cordate, obtuse, entire, on both sides as well as the branches covered with a very thin grey toment, hardly armed, short-stalked; peduncles two- or many-flowered, short; calyx half as long as the corolla, with deltoid, acute segments; anthers yellow, excelled in length by the style.

This species approaches to *Solanum orbiculare* (Dunal, Syn. 27), from which it differs chiefly in its not shining toment, and its exact, heart-shaped, somewhat larger leaves.

To complete my additions to the elaborate description of more than nine hundred *Solanum* species, published by Professor Dunal in the thirteenth volume of Candolle's 'Prodromus,' I beg to add yet the diagnosis of an unknown South Australian species, having also given since an account of three others in Professor Schlechtendal's 'Linnæa' (vol. xxv. p. 432–434).

130. Solanum *simile*, F. Muell.; unarmed, smooth; stem upright, suffruticose; leaves narrow-lanceolate, elongate, entire or lobed at the base, thin-venose; corymbs lateral, few-flowered, simple or divided; segments of the half five-parted calyx rounded, apiculate; berries globose, nodding.

Hab. On less fertile plains on the Murray and Angas River, on Spencer's and St. Vincent Gulfs, and in Kangaroo Island.

It is distinct from *Solanum laciniatum* in its constantly low stem, smallness of all parts, its never pinnatifid leaves, its shorter, nodding pedicels, and smaller, always spherical berries.

I conclude these contributions towards the Australian *Solaneæ* with the remark, that this Order received, by the first and ever-memorable expedition of the unfortunate Dr. Leichhardt, the addition of the genus *Datura* (in *Datura Leichhardtii*), and by the researches of Dr. Behr, the additional genus *Lycium* (in *L. Australe*), both unnoticed not only in the golden 'Prodromus' of R. Brown, but also in Dunal's monograph, published in 1852.

XXXVI. Boragineæ.

131. Heliotropium *lacunarium*, F. Muell.; stems herbaceous, upright or procumbent, appressed-hairy; leaves somewhat long, petiolate, oblong or lanceolate-ovate, nearly blunt, entire, not rugose, on both sides

scabrous, beneath along the margin and nerve pilose; spikes ternate, geminate or solitary, ebracteate; segments of the calyx subequal to each other, of the length of the corolla-tube; caryopsides subovate, rugose, glabrous.

HAB. Around the lagoons, and in low localities on the Murray.

XXXVII. LABIATÆ.

132. Prostanthera *spinosa*, F. Muell.; branches numerous, spreading, hispid; twigs short, spinescent, foliate at the base; leaves lanceolate or roundish-ovate, acute, entire or repand, glabrous or below imperfectly hairy; peduncles thin, axillary, solitary, surpassing twice the length of the calyx, at the middle bibracteate; calyx sparingly hispid, its lips entire, the lower one hardly longer; corolla of lilac-colour, outward but little hairy; longer spur of the anthers exceeding nearly twice the cell, the other abbreviate.

HAB. On springs and irrigated rocks in the Grampians.

This species is remarkable for its prickly branchlets.

133. Prostanthera *coccinea*, F. Muell.; branches hirtellous; leaves small, somewhat thick, with reflexed apex, linear-oblong or simply linear, blunt, flat or on the margin slightly recurved, hairy-scabrous, at length glabrescent, in the axils fasciculate; flowers near the top of the twigs axillary; peduncles a little shorter than the calyx, which is, with exception of the ciliolate margin, glabrous, its lips entire, the lower one a little longer; corolla red, three times longer than the calyx, somewhat hairy, its upper lip longest; spurs of the anthers adnate, the longer one hardly as long as the cell.

HAB. In the Mallee Scrub on the Murray, on St. Vincent's and Spencer's Gulf.

A low, diffuse bush, allied to *P. microphylla* (A. Cunn., in Benth. Lab. p. 454).

134. Prostanthera *eurybioides*, F. Muell.; branches puberulous; leaves thick, very small, glabrous, linear-oblong, entire, slightly concave,—the younger ones fasciculate, those surrounding the flowers broad ovate; flowers axillary, solitary, on short peduncles; the lower lip of the glabrous calyx nearly retuse, little exceeding the rounded upper lip; longer spur of the anthers surpassing the length of the cell.

HAB. In the Mallee Scrub towards the mouth of the Murray River.

Resembles in habit *Eurybia lepidophylla*.

W. Fitch del. et lith.

Vincent Brooks Imp.

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135. Westringia *senifolia*, F. Muell.; erect; stems densely hirsute; leaves about six in a whorl, crowded, spreading, lanceolate-linear, acute, sessile, with revolute margins, above glabrescent and scabrous, beneath as well as the calyces hirsute; flowers white, axillary, nearly sessile, forming on the top of the twigs a foliate spike; calyces to the middle divided, hardly as long as the leaves; its segments lanceolate-subulate.

HAB. On rocks in the Buffalo Ranges and on the summit of Mount Buller.

136. Westringia *violacea*, F. Muell.; leaves three in a whorl or rarely opposite, linear-lanceolate, awnless, with slightly recurved margins, glabrous on both surfaces or beneath along the rib hairy, above dotted-scabrous; pedicels, calyces, and twigs appressed-hairy; bracteoles linear-subulate, four or five times shorter than the calyx; teeth of the calyx lanceolate, acuminate, hardly longer than its tube; corolla violaceous, puberulous.

137. Westringia *Grevillina*, F. Muell.; leaves three in a whorl, coriaceous, broad-linear, spreading, acute, with revolute margin, above smooth, beneath as well as calyces and branchlets more or less grey velvet-hairy; teeth of the calyx much shorter than its tube; corolla velvet-hairy.

HAB. On the rocky coast of the Port Lincoln District, *C. Wilhelmi*. Nearest in its affinity to *W. cinerea*.

(*To be continued.*)

DECADES OF FUNGI; *by the* REV. M. J. BERKELEY, M.A., F.L.S.

Decades LV.–LVI.

(With Plates V., VI., IX., X.)

Rio Negro Fungi.

(*Continued from p.* 143.)

541. *P.* (Mesopus) *pansus*, n. s.; pileo orbiculari latissime umbilicato tenui rigido radiatim rugoso lineatoque, brunneo, zonis crebris obscurioribus subtiliter pruinoso, margine arcuato; stipite tenui brunneo pruinoso; hymenio candido, poris punctiformibus, contextu pallido zonato. Spruce, n. 205.

HAB. On wood. Panuré.

Pileus $2\frac{1}{2}$ inches across, orbicular, sometimes attached behind, broadly umbilicate, marked with a few radiating ridges and numerous raised lines, brown, painted with many darker zones; margin arched. Stem 3 inches high, $\frac{1}{8}$ of an inch thick, straight, nearly even, brown, pruinose; hymenium white; pores punctiform.

A very beautiful and distinct species.

542. *P.* (Mesopus) *partitus*, n. s.; pileo tenui coriaceo infundibuliformi e basi sæpius sursum diviso zonato rufo-variegato lineato, margine lacerato-lobato; stipite elongato umbrino pruinoso; hymenio niveo; poris mediis acie prominente. Spruce, n. 20, 200. (Tab. X. fig. 1.)

Hab. On the ground in Caatingas, Panuré. February, 1853.

Pileus 2–3 inches across, thin, coriaceous, infundibuliform, split upwards from the base, and sometimes entirely divided, variegated with red-brown tints, zoned, rough with fine lines; margin lobed and jagged. Stem 4–6 inches high, $1\frac{1}{2}$ line thick, umber, opaque, finely pruinose. Hymenium snow-white when fresh, acquiring a slight ochraceous tinge in drying. Pores $\frac{1}{60}$ of an inch across, angular; dissepiments rather rigid; edge projecting; sometimes the edges of several pores are united and raised above the transverse partition so as to form linear compound sinuses; where they are most perfect they are hexagonal.

β. cuneatus. Spruce, n. 180.

Hab. On the ground in Caatingas, Panuré. March, 1853.

The pileus is 5 inches across, and split up from the very base so as to form a large wedge-like expansion. Though on a larger scale, I can see no distinction. (Tab. X. fig. 1. *P. partitus, nat. size.*)

543. *P.* (Mesopus) *renatus*, n. s.; pileo ex infundibuliformi laterali, lobato vel subintegro crenulato tenui rigido-papyraceo badio rufo-lineato rugoso glabro; stipite elongato umbrino pruinoso; hymenio albido, poris angulatis parvis. Spruce, n. 169.

Hab. On the ground in Caatingas. February, 1853. Panuré.

Pileus 1–2 inches broad, infundibuliform, at length lateral, of a rich red-bay, slightly zoned and variegated, rough with little raised innate lines, sometimes so much so as to be rugose; thin, rigido-papyraceous. Stem 4–6 inches high, $\frac{1}{2}$–1 line thick, pale umber, pruinose. Hymenium pale umber. Pores tender when young, gradually expanding into regular hexagonal cavities $\frac{1}{140}$ of an inch broad, sometimes produced on a part only of the hymenial surface, as if they were a secondary growth; edge regular, entire.

Allied to the last, but with much smaller pores. In one specimen there is not a trace of pores, insomuch that it looks like a *Stereum.*

* *P.* (Mesopus) *heteromorphus*, Lév. in Ann. d. Sc. Nat. Feb. 1846, p. 123. Spruce, n. 16, 33, 54.

HAB. On dead wood and on the ground in Caatingas. Panuré.

544. *P.* (Mesopus) *cassiæcolor*, n. s.; pileo orbiculari tenui rigido coriaceo umbilicato opaco glabro cinnamomeo crebri-zonato-sulcato; stipite tenui irregulari; hymenio cinnamomeo; poris minutis angulatis; contextu subconcolori. Spruce, n. 189.

HAB. On the ground. Panuré.

Pileus 2 inches across, orbicular, thin, coriaceous, rather rigid, cinnamon-brown, not shining, umbilicate, marked with numerous concentric furrows and zones. Stem compound, cylindrical, 3 inches high, $\frac{1}{8}$ of an inch thick, rather irregular, brown, pruinose. Hymenium bright cinnamon; pores minute, $\frac{1}{140}$ of an inch across, angular.

Resembling in some respects *P. heteromorphus*, but distinguished at once by its bright hymenium.

545. *P.* (Mesopus) *procerus*, n. s.; pileo tenui coriaceo infundibuliformi rufo-badio zonato; stipite procero rigido umbrino fasciato; poris punctiformibus ocellatis, tramâ sulcatâ; contextu umbrino. Spruce, n. 165.

HAB. On the ground. Panuré. March, 1853.

Pileus 2 inches across, infundibuliform, thin, rigid, coriaceous, red-bay, with two or three zones. Stem 14 inches high, $\frac{1}{4}$ inch thick, somewhat compressed, umber, dilated above, pruinose, marked with browner bands. Hymenium dirty white, inclining to cinereous; pores punctiform; edge slightly sulcate.

There are but two specimens of this, in different stages of growth; the younger has a yellower tint. There are rudiments in the older specimen of three additional stems.

546. *P.* (Mesopus) *xylodes*, n. s.; pileo tenui coriaceo umbilicato umbrino zonis plurimis picto sublævi, margine arcuato; stipite gracili concolori pruinato; hymenio cinereo-umbrino; poris punctiformibus, tramâ leviter sulcatâ; contextu umbrino. Spruce, n. 42.

HAB. On the ground and amongst decaying leaves in Caatingas. Panuré.

Pileus $1\frac{1}{2}$–$3\frac{1}{2}$ inches across, orbicular, thin, coriaceous, smooth, nearly even, umber-brown, painted with very numerous and often delicate

zones, so as to resemble the section of some dicotyledonous wood; margin arched. Stem 2–3 inches high, 1–2 lines thick, tolerably regular, of the same colour as the pileus, pruinose. Hymenium cinereous-umber; pores punctiform; edge tomentoso-granulated; trama slightly grooved.

A very beautiful species. The pileus is rather dull in appearance; but possibly when growing may have a shining sericeous aspect.

547. *P.* (Mesopus) *omphalodes*, n. s.; pileo orbiculari crassiusculo convexo umbilicato rugoso zonato hepatico; stipite gracili quandoque furcato; hymenio cinereo; poris punctiformibus, acie pruinosâ; tramâ impressâ; contextu albo zonato. Spruce, n. 32, 194.

HAB. On the ground, more rarely on trunks, in Caatingas. Panuré.

Pileus 1–2 inches across, moderately thick, convex, umbilicate, liver-coloured, sometimes with a yellowish tinge, rugose and lineate; edge entire or crenate. Stem 4–6 inches high, 1–2 lines thick, sometimes forked, pale brown, pruinose, rooting. Hymenium concave, cinereous; pores punctiform, their edge pruinose, with the trama slightly grooved, terminating abruptly. The stem sometimes sinks deeply into the hymenium.

Those individuals with a yellowish tint have a smoother pileus and are more frequently zoned; the hymenium too is not cinereous; still I believe them to be the same species, because there is a specimen precisely intermediate, with the colours of the former and the sculpture of the latter, and both are intermixed. The variety may be called *P. omphalodes*, var. *fulvaster*.

548. *P.* (Mesopus) *ocellatus*, n. s.; pileo orbiculari convexo hepatico zonato sublævi radiatoque rugoso, opaco l. sericeo, nitido; stipite gracili; hymenio convexo cinereo; poris ocellatis; tramâ leviter sulcatâ; contextu sericeo cinnamomeo. Spruce, n. 192. (Tab. X. fig. 3.)

HAB. On the ground in Caatingas. February, 1853. Panuré.

Pileus 1½–3 inches across, convex, umbilicate, liver-brown, sometimes shining, sometimes opaque, even or radiato-rugose, zoned, convex, thin, coriaceous. Stem 4–7 inches high, ¼–1 line thick, sometimes compound above, umber, pruinose. Hymenium cinereous; pores punctiform, with a white edge; trama slightly grooved. Substance of pileus silky, bright cinnamon-red.

This could scarcely be distinguished from *P. omphalodes* without attending to the texture, which is totally different. (Tab. X. fig. 3. *P. ocellatus*, *nat. size.*)

549. *P.* (Mesopus) *exilis*, n. s.; pileo orbiculari tenui umbilicato rufo-badio zonato rugosiusculo; stipite gracili umbrino pruinoso; hymenio cinereo; poris punctiformibus, tramâ leviter sulcatâ; contextu pallido. Spruce, n. 31.

Hab. On the ground. Panuré.

Pileus 1 inch across, orbicular, thin, coriaceous, umbilicate, liver-coloured, zoned, slightly wrinkled, substance pallid. Stem four inches or more high, scarcely a line thick, umber, pruinose. Hymenium cinereous; pores punctiform, with the trama slightly sulcate.

Differs from *P. ocellatus* in the pale colour of its substance, smaller size, etc.: it is closely allied, but on a more delicate scale.

550. *P.* (Mesopus) *Parmula*, n. s.; pileo tenui papyraceo orbiculari umbilicato lobato l. crenato nitidiusculo rufo-badio zonato; stipite gracili umbrino pruinoso; hymenio ex albido brunneolo; poris minutis subangulatis; contextu pallide umbrino. Spruce, n. 34.

Hab. On the ground in Caatingas. Panuré.

Pileus 1–2 inches across, thin, papyraceous, umbilicate or sometimes infundibuliform, red-bay, painted with many zones, tolerably even; margin lobed or crenate. Stem 3–7 inches high, $\frac{1}{2}$–2 lines thick, umber, pruinose, sometimes fasciculate, even or nodulose, often rooting deeply. Hymenium at first nearly white, then tinged with brown; pores minute, $\frac{1}{120}$ of an inch across, slightly angular, not sulcate; substance pale umber.

551. *P.* (Mesopus) *marasmioides*, n. s.; pusillus; pileo orbiculari infundibuliformi badio zonato, margine crenato; stipite gracillimo; hymenio e pallido cinerascente; poris minutis subangulatis. Spruce, n. 21, 77.

Hab. On the ground in Caatingas. Panuré. A very common species.

Pileus $\frac{1}{3}$–$\frac{3}{4}$ of an inch across, thin papyraceous, infundibuliform, bay, zoned, smooth; margin crenate. Stem $1\frac{1}{2}$–$3\frac{1}{2}$ inches high, $\frac{1}{3}$–1 line thick, umber, pruinose, often forked, rooting. Hymenium at first pale then cinereous; pores minute, $\frac{1}{140}$ of an inch across.

This is closely allied to *P. Parmula*, but it does not appear to be merely a dwarf state of that species. The pileus is essentially infundibuliform, the pores are smaller, and their tint different. It is a very elegant production.

No. 6 is a distinct species, which I have named in my herbarium *P. setipes*, but I have not sufficient materials to establish its characters.

552. *P*. (Mesopus) *hypoplastus*, n. s.; pileo orbiculari rigido ligneo profunde umbilicato opaco brunneo zonis obscurioribus crebris picto lævi, margine repando; stipite cylindrico tenui laccato sursum compresso dilatato; hymenio albido; poris punctiformibus; contextu albo. Spruce, n. 53.

HAB. Panuré, with n. 205.

Pileus 2½ inches across, orbicular, very deeply umbilicate, hard, woody, though rather thin, opaque brown, nearly even, painted with numerous darker zones. Stem 4½–6 inches high, ¼ of an inch thick, straight, laccate, deep red-brown, dilated at the apex and compressed. Hymenium concave, nearly white; pores punctiform, abruptly ending where the stem enters the pileus.

The above is described from the most perfect specimen, which was placed with n. 205, a very different species. Under n. 53 was sent another specimen, with a lateral pileus, but with the stem remarkably dilated above; so different however in general appearance that it might easily have been considered as distinct, though an attentive examination shows its identity with the other.

553. *P*. (Mesopus) *diabolicus*, n. s.; pileo crassiusculo rigido umbilicato depresso, primum subtiliter velutino, cito glabrescente, margine primum integro, demum crenato lobato; stipite cylindrico sublaccato lævi, disco orbiculari affixo; hymenio brunneo postice libero; poris punctiformibus. Spruce, n. 195.

HAB. On dead trunks. February, 1853. Panuré.

Pileus 4–6 inches broad, umbilicate, depressed, at first minutely velvety in the centre, but soon becoming smooth and shining, deep bay, sometimes producing new pilei from its surface, entire or strongly lobed and crenate; edge in young specimen erect, but afterwards arched. Stem 3 inches or more high, ½ inch thick, of the same colour as the pileus, with a smooth, rigid, almost laccate cuticle, firm, solid, cylindrical. Hymenium dark umber, free behind and separate from the stem; pores punctiform, very minute.

Allied to *P. varius*, but most distinct.

554. *P*. (Mesopus) *rufo-atratus*, n. s.; pileo tenui orbiculari umbilicato pruinoso velutino glabrescente radiatim lineato rufo; stipite tenui; hymenio pallido; poris punctiformibus. Spruce, n. 196.

HAB. On decayed trunks of trees. Panuré.

Pileus 1½ inch broad, at first reddish umber, clothed with short, pale, velvety pubescence, then smooth, deep red-brown, umbilicate,

marked with radiating lines. Stem slender, 2–3 inches high, 1 line thick, irregular, here and there nodulose, nearly black. Hymenium pale; pores punctiform, ending abruptly round the swollen tip of the stem; interstices plane.

Differs from *P. diabolicus* in its slender habit, thinner pileus, more slender stem, which is not attached by a disciform base. It is closely allied but certainly distinct.

555. *P.* (Mesopus) *vernicosus*, n. s.; pileo orbiculari umbilicato atro-rufo vernicoso polito radiatim lineato; stipite gracili atro; hymenio brunneo; poris apice contractis interstitiis depressis. Spruce, n. 50.

HAB. On decayed trunks. Panuré.

Pileus about 2 inches across, umbilicate, moderately thick, rigid, dark rufous, with an indistinct zone, shining as if varnished, marked with radiating lines; edge thin, lobed or crenate. Stem slender, 1½ inch high, 1 line thick, rigid, black. Hymenium brown; pores decurrent but ending abruptly; orifice contracted; interstices depressed.

Evidently allied to the foregoing species, but differing in the varnished pileus and contracted pores.

* *P.* (Mesopus) *oblectans*, Berk., Hook. Lond. Journ. vol. iv. p. 51. Spruce, n. 15.

HAB. On dead wood. Panuré.

Besides the ordinary form there is one on a far larger scale. Pileus 2 inches across. Stem 3½ inches high. Beautifully velvety.

One individual from Ceylon is nearly as large.

556. *P.* (Mesopus) *luteo-nitidus*, n. s.; pileo rugoso luteo sericeo-nitente irregulari-lobato crebri-zonato primum subvelutino; stipite deformi spongioso-vestito; poris punctiformibus luteo-olivaceis. Spruce, n. 51.

HAB. On the ground. Panuré.

Pileus 2 inches across, convex, orbicular, sometimes depressed, yellowish at first, finely velvety, then shining with a sericeous aspect, irregular, rugose, lobed. Stem 2 inches or more high, ⅓–½ an inch thick, often compressed, clothed with spongy down of the colour of the pileus. Hymenium olive-yellow; pores decurrent, punctiform.

In the style of *P. tomentosus*, but very distinct. Occasionally the stem is divided above proliferously.

557. *P.* (Pleuropus) *passerinus*, n. s.; pileo primum spathulato-flabelliformi rubro-badio nitido demum connato-cupulæformi umbrino;

stipite gracillimo; hymenio ex albo umbrino; poris minutissimis. (Tab. X. fig. 2.)

HAB. In Caatingas. Panuré.

Pileus 1–2 inches across, at first spathulato-flabelliform, then truly flabelliform, and at length cup-shaped from the confluence of the edges, deep bay, shining, nearly even. Stem 8 inches or more high, not a line thick, irregular. Hymenium at first white, then umber; pores $\frac{1}{216}$ of an inch across, subhexagonal.

Allied to *P. renatus*, which has larger pores. In both the pores seem tender. (Tab. X. fig. 2. *P. passerinus*, *nat. size.*)

558. *P.* (Pleuropus) *macer*, n. s.; pileo reniformi rigido coriaceo hepatico subzonato; margine integro; stipite elongato umbrino pruinoso sursum nigrescente; hymenio concavo brunneo; poris punctiformibus, tramâ sulcatâ; contextu pallido subluteo.

HAB. Panuré.

Pileus $1\frac{1}{4}$ inch across, reniform, entire, rigid, coriaceous, deep liver-coloured, smooth, with two or three zones; substance pallid, inclining to yellow. Stem 9 inches high, 2 lines thick, umber, pruinose, becoming black or bay above, especially at the apex. Hymenium concave, brownish; pores punctiform, ocellate. Trama slightly sulcate.

This is evidently distinct from *P. ocellatus* in its yellowish not reddish substance, and other points. Unfortunately there is but a single specimen.

559. *P.* (Pleuropus) *pallidus*, n. s.; pileo suberoso convexo reniformi pallido zonis crebris notato; stipite laterali umbrino pruinoso; hymenio leviter umbrino concavo.

HAB. On dead wood. Panuré. Spruce.

Pileus 3 inches across, hard, corky, reniform, convex, pallid, marked with numerous darker zones; margin obtuse, nearly entire. Stem 2 inches high, $\frac{1}{3}$ of an inch thick, rather irregular. Hymenium of the same colour as the pileus.

A beautiful species, resembling *Polyporus Camerarius*.

560. *P.* (Pleuropus) *brunneo-pictus*, n. s.; pileo convexo reniformi radiato-rugoso brunneolo zonis crebris sulcisque concentricis picto subsericeo; stipite laterali umbrino pruinoso sursum dilatato; hymenio pallide umbrino-brunneolo; contextu cinnamomeo. Spruce, n. 55.

HAB. On dead wood. Panuré.

Pileus 2 inches across, reniform, convex, corky, slightly radiato-

rugose, brownish, painted with many darker zones, which are sometimes deeply impressed; substance cinnamon-coloured. Stem nearly 3 inches high, $\frac{1}{3}$ of an inch thick, compressed, straight, slightly uneven, umber, pruinose, strongly dilated above. Hymenium concave, pale brownish umber, distinctly defined all round the dilated apex of the stem. Apices of tubes papular, with a central aperture.

A very beautiful Fungus, allied to *P. pallidus*, but with many distinct characters.

(To be continued.)

BOTANICAL INFORMATION.

Mr. Spruce *in Peru.*

By letters recently received from the enterprising botanist and traveller Mr. Spruce, dated December 25, 1855, we find that he has reached Tarapoto, on the Huallaga, in Peru. His immediately previous letters were from Yurimaguas, "from which place," he writes, "I did not get away till the end of June, and on the 21st reached the end of my long voyage. Yurimaguas has the most equable temperature I have anywhere experienced, the thermometer sometimes not varying more than 3° in twenty-four hours; but I have found no place so relaxing, and the addition of a severe attack of diarrhœa and catarrh had reduced me pretty low when I left. Periodic returns of this diarrhœa and ulcerated feet, caused by walking in the cold water of mountain streams, are the chief inconveniences I have experienced at Tarapoto. In other respects I am more agreeably placed than anywhere previously in my South American wanderings. I am among magnificent scenery and an interesting vegetation, and there are a few pleasant people with whom to converse. The pampa, or plain, of Tarapoto is a sort of amphitheatre, entirely surrounded by hills, and so large that London might be set down on it; its position is in the lower angle of the confluence of the Mayo and Huallaga, and the town itself is about three leagues from the latter river. The hills are an offshoot from the main ridge of the Andes, and, from being watered by the Mayo and its tributaries, I must call them, for want of a better name, the Mayensian Andes. The ridges rise to some 3000 feet above the Pampa, and some

points are probably much higher. In a future letter I may perhaps sketch more minutely the geographical and other features of Tarapoto. Good botanizing ground is unfortunately rather distant. The Pampa either is or has been wholly under cultivation, with the exception of the precipitous banks of the rivulets, and it is a long way across it to the foot of the hills. The summits of the hills have most of them never been reached, and they are clad with the same dense forest as the Amazon, showing rarely scattered bald, grassy places, called 'pajonales' or 'pastos.' Where there are no tracks one must ascend by the beds of the streams, all of which, including the Huallaga, have the peculiarity of being, as the Peruvians say, boxed in (*encajonado*) between steep walls of rock, where they issue from the hills. These steep narrows are called 'Pongos,' and often include falls and rapids; they are rich places for Ferns, but it is both difficult and dangerous getting along them, now and then scrambling over large slippery rocks which block up the passage, or wading up to the middle through dark holes, with the water below 70°. An exploration of one of these places generally costs me a week's suffering in the feet. I have at last got into a Fern country, and have already gathered more species than in all my Brazilian and Venezuelan travels. Mosses also are more abundant, and there is a greater proportion of large species. Among the flowers I believe you will find a good share of novelty. I expect I have two new genera of *Rubiaceæ*, both very fine things, one of them allied to *Calycophyllum*, but with large flowers, almost like those of *Henriquezia*. There are new things also in several other tribes. The general character of the vegetation is, as might be expected, intermediate between that of the valley of the Amazon and of its alpine sources. As evidences of an approach to cooler regions, and to a Flora more European in its affinities, I may mention having met here, for the first time in my American travels, a Horsetail, a Poppy, a Bramble, a Crosswort, and a *Ranunculus* (a minute species, trailing over moss by mountain-streams, and looking quite like a *Hydrocotyle*). The Ferns may possibly include some new species, especially among the larger ones, which are likely enough to have been passed over on account of their bulkiness. The fronds of one of these are twenty-two feet in length, though it never shows more than a rudimentary caudex; its affinity seems to be with *Cyathea*. In my collection are a good many species of *Grammitis*, *Meniscium*, *Davallia*, *Diplazium*, *Litobrochia*,

Aneimia, etc., together with several pretty *Selaginellas*, and an Adder's-tongue. A small species of *Grammitis*, growing on trees in the mountains, is very odoriferous when dry, and the Indian women put it in their hair, calling it *Asiníma*.

"These things have not been got together without greater trouble than I had calculated on. I expected to find roads on which I could take long journeys with mules; but though there are a few mules, there are no roads on which they can be taken with cargoes. Between Moyobamba and the Huallaga all cargoes must be carried on Indians' backs, and indeed throughout the eastern slope of the Cordillera the roads rarely admit of any other mode. The number of Indians is constantly diminishing, and barely suffices for the ordinary traffic of the district. I have ridden a few times across the Pampa to the hills; but for longer excursions this mode does not suit. The journey alluded to at the opening of my letter was to visit a mountain lying beyond the Mayo, at two days' journey from Moyobamba and three from Tarapoto. It is called the Campana, from some fancied resemblance to a bell, and the road crosses it at about 3500 feet* (by barometer) above the plain of Tarapoto; but there is a peak to northward of the pass rising 1000 feet higher. It differs notably from the adjacent mountains by being nearly all *Pasto*, only the valleys and ravines towards its base being filled with forest, in which abundance of Palms are conspicuous. The only habitation there is a *chacra* on the side next Moyobamba, at 1500 feet below the Pass, and with no other dwelling nearer than a day's journey. Here I established myself with a stock of paper and with provisions for three weeks, which I had taken the necessary precaution of carrying with me from Tarapoto. My cargoes loaded five men on the way thither and six on the return. I have reason to be satisfied with my success at the Campana; and I should probably have brought away more specimens, had not my host, a few days after my arrival, been severely bitten by a snake, the cure of whom prevented my leaving the house far for several days.

"I have been most put about here for materials of which to make boxes, as such things as boards are not to be had. The only use the inhabitants have for a board is to make a door; and this is either cut out of some old canoe or they cut down a tree in the forest, roughly carve out a door from it on the spot, and bring it home on their backs.

* Perhaps 5000 feet above the sea, but I have no barometric readings below the mouth of the Rio Negro.

For other purposes, such as benches, shelves, bedsteads, etc., the never-failing *Cáña brava* (*Gynerium saccharoides*) is all they require. After trying in vain to buy boards, I went to two posts on the Huallaga, and in each of them bought an old canoe. I had then to go again with a carpenter to cut them up into pieces of a convenient size, which had to be conveyed to Tarapoto on Indians' backs, and afterwards laboriously adzed down into something like boards. All this, with the trouble of looking up Indians, the making of two boxes and preparing boards for other two, left me little leisure for anything else for the space of near a month.

"Supposing that all is right, I propose extending my stay at Tarapoto to a little over the twelvemonth, say to somewhere in August. I shall thus be able to gather a few things which illness and fatigue obliged me to leave at the time of my arrival. I have been on the top of three mountains, and their vegetation is so nearly identical that I should hardly find work at Tarapoto for a second year. Mathews was five months at Tarapoto, where he is said to have gathered very few plants, and only in the Pampa. Moyobamba he was accustomed to visit every year, but Chachapoyas was his residence. I have endeavoured to explore the places which I know he did not, but I cannot expect much novelty if I follow his track to the Cordillera. There are three courses open to me from Tarapoto; one is to go towards the coast (by Moyobamba, Chachapoyas, etc.), which, for the reason just mentioned, is not to be thought of; the second is to ascend the Huallaga to Huanuco, a perilous voyage of from four to six weeks, where every year numbers of cargoes are lost, and only light goods can be taken. The immediate vicinity of Huanaco is all cultivated; but the highest mountains of Peru are accessible from thence, and the frigid lake of Lauricocha, the source of the Amazon; but I presume this district has been much explored, as it is far more easily reached from Lima than from here. The last course is to descend the Huallaga, and then (unless I go direct home) ascend to Quito either by the Pastaza or Napo. There is a Quitenian at Tarapoto who has several times made the voyage to Quito by both these routes, and who talks of going again next autumn. I am strongly inclined to accompany him, notwithstanding that I must thus again risk a painful and dangerous voyage. In five or six weeks from Tarapoto I could reach Hambato or Riobamba, whence to Quito is but a few days. By the Napo I

should be longer, as the ascent of this river alone takes two months. Nothing bulky could be taken either way, nor would it be necessary, as paper and everything else can easily be obtained at Quito. Notwithstanding so many travellers have visited Quito, I am certain it is still the most splendid station for a botanist in South America. Pichincha and the immediate neighbourhood have no doubt been well explored, but the eastern slopes of Cotopaxi, Tunguragua, etc., seem still unvisited, and it is such a fine thing to have head-quarters where every necessary can be promptly obtained. The mere circumstance of being where bread was abundant and cheap would make an immense difference in excursions of several weeks. Here there is neither bread nor farinha, but in their stead plantains, of which a man eats up all he can carry in three days.

"My Cryptogamic collection is daily increasing in value, and at Quito would be doubtless much enriched. I should like to ascertain whether there would be a sale in England and on the Continent for forty sets of the *Cryptogamia* (Ferns, Mosses, Hepaticæ, Lichens, and Fungi) of Equatorial America at 30*s*. the hundred, the specimens being all carefully named. I intend to consult also Mr. Mitten (when I can find time to write to him), who I dare say would assist me in the distribution of the *Cryptogamia* in the same way as you do of the flowers. In the case of buyers being secure for these, it might be worth my while to make Quito my residence for some years. It would of course be optional to subscribers to limit themselves to certain tribes of the *Cryptogamia*. It is needless to add that I should continue to collect the most interesting *Phanerogamia*.

"R. Spruce."

NOTICES OF BOOKS.

Géographie Botanique Raisonnée, *ou Exposition des Faits principaux et des Lois concernant la Distribution Géographique des Plantes de l'époque actuelle; par* M. Alph. de Candolle. 2 vols. 8vo. Paris.

(*Continued from p.* 157.)

Chapter 13 is devoted to the distribution of the species of a genus in the area occupied by the genus.

Chapter 14. On the Area or Extent of Surface occupied by Genera.

Chapter 15. On the Origin and Duration of Genera: and the changes that their habitats are undergoing at the present epoch.

Chapter 16. On the Geographical Position of Families: on their limits, and on the general character of the countries they occupy.

Chapter 17. On the Distribution of the Plants belonging to a Family in the area the family occupies, and on the comparison of different Families from this point of view.

Chapter 18. On the Area occupied by Families.

Much curious matter is introduced into several of the above Chapters, though the subjects to which they refer are not treated in the same manner or spirit that the previous ones are. They are all of too fragmentary a character to admit of any general conclusions being drawn from them; they are also so much broken up into articles with different headings, under many of which the same kind of information is repeated in reference to the speciality of which the article treats, as to be rather confusing. In those especially devoted to the distribution of Natural Orders it appears to us that the extremely different opinions entertained by botanists as to the limits of the Orders themselves is an obstacle to any results being obtained, except from a tabulation of the genera and species of the whole vegetable kingdom upon two distinct plans; one under the fewest Natural Orders under which they can be arranged, and the other under the greatest number into which they have been divided.

M. de Candolle, however, probably conceives that the usually accepted Natural Orders are capable of better limitation than we do. This is in accordance with his theory that genera are more natural assemblages of species than species are of individuals, and that the higher we ascend in the scale the better limited are the groups. Now, though it is very true that although in the present state of our knowledge the structural and physiological distinctions found to exist between Phænogams and Cryptogams are absolute, those between Monocotyledons and Dicotyledons very nearly so, and that Gymnosperms and Angiosperms are well structurally marked, we do not find that the Natural Orders of these great divisions are so well defined. It is true that they may be perfectly natural for the most part; that is to say, that the osculant genera may be few; but when few, they often embrace a host of species: and though it may be by but one genus that an Order is united with another Order, the majority of the genera in that Order

may be in the same relation to as many other Natural Orders. On the other hand, the limits between many of the most natural groups of plants are purely arbitrary, as has been repeatedly shown. Thus the irregular-flowered Monopetaleæ, *Scrophularineæ*, *Solaneæ*, *Acanthaceæ*, and *Cyrtandraceæ*, are all artificially divided in books, but in reality are united by numerous osculant genera; so are the regular-flowered families *Rubiaceæ*, *Loganiaceæ*,* *Caprifoliaceæ*, *Gentianeæ*, etc.; and again, the subclasses of *Compositæ*, *Rosaceæ*, *Leguminosæ*, *Saxifrageæ*, and of many others, are as well entitled to be called Natural Orders as any of the above.

In Cryptogams the same holds good to a greater degree. The families *Algæ*, *Lichenes*, and *Fungi* are truly natural, but there are no limits between them. Difficult as the species of *Polypodiaceæ* are to define, the genera have hitherto proved impossible; of Mosses the same holds true. The fact is, there appears to be no appreciable relation between the extent of the natural groups in the vegetable kingdom and the constancy of the characters that separate them. Whether species are originally distinct creations or not is as yet unproven, but there is no difficulty in proving that the greater majority of the generally-admitted genera and Natural Orders are, though natural assemblages, not limited by nature.

If we now turn to some of the examples given under the articles, it will be seen not only that this uncertainty vitiates the results obtained by M. de Candolle, but that his information upon the distribution of many Natural Orders is insufficient to draw conclusions from. Under the head of Families whose limits are very restricted sixteen are mentioned; of these *Rousseaceæ* consists of one genus and one species (con-

* In the case of *Loganiaceæ* especially, Mr. Bentham's Paper on this Order, read before the Linnæan Society (March, 1856), proves that the affinities between all its genera and those of other natural families are so close, that its retention as a natural family is a purely arbitrary exercise of the systematist's prerogative, and that, paradoxical as it may appear, the several genera of *Loganiaceæ* are more allied to plants that are true members of *Rubiaceæ*, *Gentianeæ*, *Apocyneæ*, etc., than these Natural Orders are to one another. It is because the genera of *Loganiaceæ* are more closely allied to each other than those other Orders (in which they find equally close allies) are, as a whole, to one another, that the Natural Order claims an independent position. In affirming that most Orders are, like genera, arbitrary creations of the systematists, we mean no more than that there is no evidence in the present state of our knowledge to the contrary; if the Natural Orders are absolutely definable, we are as far from having ascertained the philosophy of their distinctions as when Linnæus first alluded to them or Jussieu classified them. Close observation and the study of development has done as much to break down some distinctive characters as to establish others.

fined to the island of Mauritius), which is included in the Natural Order *Brexiaceæ* by Lindley and others; and *Brexiaceæ* cannot be excluded from the Natural Order *Saxifrageæ* by any constant artificial or natural characters. The next Order is *Puniceæ*, which certainly should not be removed from *Myrtaceæ*. *Brunoniaceæ* again was considered a section of *Goodenovieæ* by Brown; *Leoniaceæ* consists of *Leonia*, which is truly a member of *Violarieæ; Cyphiaceæ* is almost unanimously regarded as a member of *Campanulaceæ; Alangieæ* is certainly not distinct from *Corneæ; Calycantheæ* are scarcely distinguishable from *Rosaceæ; Rhizoboleæ* are included by some in *Guttiferæ; Aquilarineæ* are a section of *Daphneæ* in the opinion of some excellent botanists; and *Centrolepideæ* are only a section of *Restiaceæ*.

The object of the selection of sixteen made by M. de Candolle is to show, that there is a certain relation between the number of species a family possesses and the extent of the area it inhabits, the smaller Orders having narrow ranges; but, as we have seen, some of these Orders are not worthy of being considered as such; and further, some of these and of others have a wider distribution than he assigns to them, as *Aurantiaceæ* (which have several Australian and even South African genera, and apparently one American*), *Alangieæ*, *Aquilarineæ*, *Centrolepideæ*, *Epacrideæ*, and *Monotropeæ*. It would further be easy to select more than sixteen groups, all very small, and as well or better entitled to be considered Natural Orders, which have very wide ranges, as *Cuscuteæ*, *Ulmaceæ*, *Cassytheæ*, *Hernandieæ*, *Surianeæ*, *Basellaceæ*, *Chloranthaceæ*, *Scleranthaceæ*, *Elatineæ*, *Podostemaceæ*, *Saururaceæ*, *Trirideæ*, *Balanophoreæ*, *Rafflesiaceæ*, *Amyridæ*, *Nelumbiaceæ*, *Hydropeltideæ*, *Reaumuriaceæ*, *Rhizophoreæ*, *Avicennieæ*, *Pangiaceæ*, *Atherospermeæ*, *Betulaceæ*, *Hamamelideæ*, *Callitrichaceæ*, *Empetraceæ*, *Cycadeæ*, *Typhaceæ*, *Lemnaceæ*, and indeed many others.

Amongst Monocotyledons, of which M. de Candolle says that no family is so limited as those of the Dicotyledons he mentions, there are *Apostasiaceæ*, *Philesiaceæ*, *Gilliesiaceæ*, *Philydreæ*, *Cyclantheæ*, *Phytelepheæ*, *Nipadeæ*, all of which are as entitled to rank as natural families as those mentioned, though we do not allow them all that rank, and which are very limited in number of species and in range too.

The above observations are not put forward to disprove M. de Candolle's conclusions, but to show that they are based upon insufficient

* See *Casimiroa*. Seemann, in Voy. Herald.

data, and that these chapters are not all treated in the same manner or spirit that the previous ones are.

Book III. Botanical Geography.

Chapter 20. The opening chapter discusses the characters of the vegetation of a country under a series of articles; the first of them is devoted to the nature of these characters, considered by themselves.

1. *Characters relating to the classes*, treats of—1, the proportion of Phænogams to Cryptogams; this inquiry is pronounced to be very useless* in the present state of science;—2, that of Dicotyledons to Monocotyledons is, we are informed, little better worth attention, owing partly to causes which M. de Candolle considers to be overlooked by authors who are ordinarily very judicious;† as because the numbers of *Cyperaceæ* and *Gramineæ* in cold countries, and of *Orchideæ* in hot, are not usually well ascertained; because the proportion of Monocotyledons is smaller in a large area than in a small part of that area (owing to the greater extension of the species of Monocotyledons); and because the Monocotyledons belong to very different Families in different parts of the world.‡

2. *On the proportions of groups of greater value than Natural Orders, and less than Families*:—This inquiry is also considered to be of littl value.

M. de Candolle justly remarks that it is of high importance to ascertain the relative amount of herbaceous and woody plants in a Flora; of annuals, biennials, etc., and of other characters, such as succulence, persistence of foliage, and number of plants with compound leaves,‖ because all these give a character to every vegetation. The desirability

* This unqualified denunciation of what has appeared to many of the first botanists of the day a curious and interesting subject of inquiry, rather takes us by surprise. That the numerical relations of Cryptogams to Phænogams often affords a most striking illustration of corresponding differences in climatic conditions, is of itself sufficient proof of the subject having some interest.

† These causes, though put forward as if new, are by no means so; all of them have been discussed in works relating to the subject in question, and some of them are so trite and obvious to any observer, that it is going too far to suppose them overlooked where they are not put forward.

‡ The force of this objection we cannot at all perceive, nor why a similar one should not be applied to Dicotyledons.

‖ The amount of plants with compound leaves we hold to be, in this point of view, very immaterial, though so insisted upon by some naturalists; they rarely give a character to the vegetation, and, except in individual cases, the traveller cannot tell, at a few yards' distance, whether a tree has simple or compound leaves.

also of statistical tables, showing the proportions of forest, tilled, marsh, grass, etc. land, we also entirely concur in, but cannot regard it as strictly, and in detail, a branch of Botanical Geography. With regard to the classifications of plants under certain forms, proposed by Humboldt and carried out further by Meyen, they are of little service; for, however useful they appear to those who confine their attention to individuals in herbaria and gardens, they are found to be useless in practice to a much greater degree than is commonly supposed.

3. *Characters relating to Natural Orders.*—The calculations usually made to determine the proportion of species in a Family, necessarily supposes, we are told, that the species of different Families are equally abundant in individuals in the same country.* In this and in the three following sections, devoted to characters relating to the genera, to the species, and to the uniformity or variety of the vegetation of a country, M. de Candolle dwells almost wholly upon the exceeding vagueness of the inquiry, the multitudes of sources of error, and the small value of the results. In the main he is no doubt right; but when he says, under the article, "On the relative value of characters of vegetation," that he dissents from the opinion of certain botanical geographers, who deem it expedient to commence by giving numerical data, because "exact methods" only satisfy him, and because exactitude does not always consist in employing figures instead of words, but in giving to every fact and every point of view its true value, we are tempted to ask, where is the exactness of the methods employed by M. de Candolle in determining climatic conditions? and above all, what are the values of the figures employed in the articles devoted to the areas occupied by species, genera, families, and classes? what indeed does any branch of the subject of Botanical Geography consist of, but vague hypotheses, and a collection of facts of unknown value and application? Moreover M. de Candolle appears here to confound unnecessarily two very different subjects of inquiry, which are never supposed, by inquirers of ordinary intelligence, to have even a relative

* This does not appear to us to be the case; all these methods of ascertaining relative proportions are confessedly extremely imperfect, nor have authors regarded them as affording anything but rude approximations to truths. That laws regulating the proportions of the Families, etc., do exist, no one will deny; and the reason of these attempts to ascertain them by laborious calculations being of less absolute value than would be wished, lies in the fact that Botany is not an "exact science," and that Botanical Geography is one of the loosest branches of it.

value, and between which he himself elsewhere discriminates: these are, the numerical proportions of the species and Natural Orders, which afford strictly the botanical features of a country; and the relative number of individuals, and their habits and appearance, which determine the physiognomy of its vegetation. Different classes of naturalists, and above all, naturalists with differently constituted minds, will attach more or less importance to one or other of these subjects; and the fact of the first not satisfying M. de Candolle's love of the exact, or rather of its not fulfilling his idea of what is exact, is rather to be attributed to his not taking the same interest in one branch of speculative inquiry, which he does in others equally barren of direct results, and equally exposed to innumerable sources of grave error. Were it not that no amount of prospective labour has deterred M. de Candolle from the full and complete investigation of the earlier-treated subjects in his work, we should be inclined to suspect that the complexity of the phenomena, the difficulty of correlating the principal facts, and the multiplicity of detached observations requiring investigation, had influenced his judgment as to the relative value of this branch of the inquiry, and of those that precede it.

Chapter 22. On the comparison of the relative proportion of Monocotyledons to Dicotyledons in different countries.—Under this subject (which however is considered as of doubtful importance) M. de Candolle gives a tabular statement of the number and proportions of Dicotyledons and Monocotyledons in sixty-eight different countries. This is a document of great value, however little it may be available in the present state of our knowledge for solving the problem for which it is collected and arranged. The principal laws deduced from it are, that in temperate regions the proportion of Monocotyledons decreases relatively to the Dicotyledons in approaching the tropics; and that, *ceteris paribus*, Monocotyledons prevail relatively to Dicotyledons in humid countries, and the reverse in dry countries. A very careful investigation follows of the available data for determining the same proportions in mountain countries, and some good observations on the results of comparing mountain regions with analogous climates in this respect.

In concluding the chapter M. de Candolle repeats that he finds it impossible to attach any real importance to the proportions presented by the two great classes of flowering plants, not only for the reasons

previously given, but because these proportions depend upon different laws, sometimes of one kind, sometimes of another, sometimes general, sometimes local. This last objection appears to us to apply to every branch of the study of Botanical Geography; whilst the very fact that Monocotyledons are, as compared with Dicotyledons, more widely spread, more variable as species, more difficult of association in limitable genera, and more difficult of distribution into Orders characterized by structural or physiological characters, demands the closest investigation of the local and general conditions of the countries in which they appear in unduly great or small proportion, relatively to the Dicotyledons. The first step to be made in such an inquiry is undoubtedly to ascertain their numerical proportions. It matters not that the class of Monocotyledons is represented by very different genera, or even Orders of plants, in the different countries which afford data to start from, for the variable element is everywhere present, and in a greater degree amongst Monocotyledons than Dicotyledons.

Chapter 22. On the comparison of different countries with respect to those Natural Orders which abound most in Species.—For this investigation M. de Candolle has collected an invaluable series of tabulated materials, at great labour, for which alone he merits the thanks of his fellow-botanists. Upwards of 130 general and local floras have been submitted to analysis, and the proportions of the seven or eight largest Natural Orders contained in each are given, which, on the average, include half the Phænogamic plants in each Flora. The naturalized plants are (we think unfortunately) included; on the one hand, it would have been difficult to have eliminated them perfectly; but on the other, their introduction has sometimes led to the most serious errors. Thus the flora of Ascension, which numbers only 4 or 5 native flowering plants, is represented as containing 39, many of the additional species not being even naturalized, but garden plants; whilst, instead of taking Roxburgh's list of St. Helena plants (in Beatson's Tracts), which includes about 30 species and is a very near approach to the truth, that of Antomarchi is preferred, as "la moins pitoyable des quatres Flores publiées jusqu'à présent," and of which all we can say is, the least contemptible is the most ridiculous.

There are two sources of difficulty in the investigation of the Floras analyzed in this Chapter, which are quite inseparable from the subject in the present state of our knowledge, and which are, firstly.

the widely different local conditions of many of the areas, and especially the presence of lofty mountains in some; and secondly, the extremely different views taken by the authors of the several Floras, of the value of specific characters. Thus, Ledebour's estimate of the Flora of Dahuria, Baikal, etc., at upwards of 1336 flowering plants, is manifestly founded upon ideas of species which are totally incompatible with those of Beck, who estimates the Flora of the Northern and Middle United States at 2125, or of Georgia and South Carolina at 2158; and in general we may remark that the North American botanists take a much wider, and, we think, a more philosophical view of the value of specific characters than many European botanists do. We should also have preferred Watson's corrected estimate of the real number of indigenous British plants, to that adopted, which includes a number of plants whose claims to be considered as species or as British nobody vindicates. On the other hand, any comparisons founded on a collection of only 305 New Guinea plants (an archipelago which must contain upwards of 3000), and in which collection the *Orchideæ* are almost five times more numerous than the *Rubiaceæ*, and three times more numerous than the *Leguminosæ*, and in which 14 Orders, including *Scitamineæ*, *Sapoteæ*, and Palms, all appear as more numerous than the *Compositæ*, which latter Order has, further, fewer than seven species, are manifestly adapted to mislead.*

We do not mention these points as objections to the tables being introduced, nor because we suppose M. de Candolle to be ignorant of them, but because we consider that they are sources of greater inexactness in the method, and introduce graver errors into the results, than those causes which, he says, render the inquiry into the relative proportions of Dicotyledons and Monocotyledons almost useless.

Under the head of the number of families in a country to which half the species it contains belongs, the general law is given, that the richer a Flora is in species, the greater the number of families which must be enumerated, commencing with the largest, before half the number of species is included; in other words, the richer the Flora the greater the number of Natural Orders.

Chapter 23. On the comparison of different countries as regards their most characteristic Natural Families.

* In another place we find it stated without a qualification that the *Orchideæ* form sixteen per cent. of the Flora of New Guinea; and the *Compositæ* fifteen per cent. of that of Ascension, where we know there is not one native species of the Order.

A Natural Order may, M. de Candolle remarks, be characteristic in two senses,—by containing an unusually great number of species as compared to what other countries do, or by containing a great number as compared with the other Natural Orders in the same country; and he treats the question under both aspects. To tabulate his materials he divides the globe into thirteen regions, which are considered natural. These are—1, the North Polar, or Arctic; 2 and 3, the North Temperate regions of the Old and New World; 4 to 7, tropical America, Africa, Asia, and Polynesia; 8, New Holland and Tasmania; 9, New Zealand and adjacent islets; 10, South Africa; 11, Kerguelen's Land, the Crozets, etc., and Tristan d'Acunha; 12, Chili, Buenos Ayres, and South Brazil; 13, Patagonia and the Falklands.*

Under these divisions the names of the Natural Orders eminently characteristic are enumerated.†

Chapter 24. On the variety of vegetable forms in different countries, and in the world at large.—An extremely valuable table is given, showing the ascertained and probable total number of species in nearly one hundred different countries, grouped approximately according to their areas, together with the latitude and area of each. The column of ascertained species apparently follows the highest estimates attainable, the British species being taken at 1520, and those of the Russian empire at 6366.‡ The estimated probable number of species is greatest for South Africa, amounting, according to Drege, from 16,000 to 20,000 in the countries including the Cape district and from the Gariep River to Port Natal, a number which so excessively exceeds that of any other country included in the list as to excite surprise, if not incredulity.

Under the head of "Comparison of the great divisions of the Globe," M. de Candolle states that America appears to have more species than any area of equivalent extent, which he attributes to the direction of its mountain-chains. Africa appears to be poor in species, except at its south extreme, where they are very numerous,—a circumstance he can only account for either by supposing that the Flora was originally that of a country with more marked differences of climates in its different

* Of these we should not regard the 1st, 7th, 11th, and 13th as at all worthy of being ranked as regions, and the 9th as doubtful.

† *Stackhousieæ* are omitted in the Australian list; *Sapindaceæ* and *Begoniaceæ* can hardly be considered eminently characteristic of tropical America, considering how very many Asiatic species there are; *Antidesmeæ* are omitted in the tropical Asiatic Flora.

‡ A number which, as has been shown in this work, Vol. V. p. 320, is no doubt capable of very great reduction.

parts than it now presents; or by the intermixture of the Floras of adjacent islands with different vegetations, which have since disappeared.*

(*To be continued.*)

SYLLOGE GENERUM SPECIERUMQUE CRYPTOGAMICARUM *quas in variis operibus descriptas iconibusque illustratas, nunc ad diagnosim redactas nonnullasque novas interjectas ordine systematico disposuit* C. MONTAGNE, D.M., etc. etc. Paris, 1855, 8vo, pp. xxiv. and 498.

We have here, in a fair and well-printed volume, an epitome of the numerous descriptions of new species of Cryptogamic plants which the Author has published during the last quarter of a century in the leading scientific journals in various countries, and in the reports of voyages of discovery instituted from time to time by the French Government. Many of these books are extremely expensive, and to be found only in public libraries or in the hands of persons of considerable means; and scientific journals are so numerous that no ordinary purse can secure the regular supply even of the most important. A large portion therefore of the Author's labours were hitherto available only at a considerable expense of time and labour; and even those who have had the good fortune to be in constant correspondence with the Author, and therefore to possess most of his Memoirs, will rejoice to have the whole digested in a compact form, easy of consultation from the scientific arrangement and the incalculable aid of an excellent index. No less than 1684 species, the greater part of which are new, are characterized in the volume, and some interesting notes and remarks are added occasionally, containing information on points either of particular or general interest. At the same time unavoidable errors are corrected, and the whole nomenclature and arrangement ordered according to the most recent information in each division; several new species also are now published for the first time, and amongst them the novelties contained in a very interesting collection of North American *Fungi.* The work cannot fail to be most welcome to every one interested in Cryptogamic botany; and we trust that the Author will be indemnified for the outlay attendant on his disinterested labours.

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* M. de Candolle probably underrates the extent and elevation of the South African mountain-chains, and overlooks the fact that the eastern and western coasts of that country have markedly different climates, determined by the presence of periodic rains on the eastern side.

Chloris Andina; *Essai d'une Flore de la Région Alpine des Cordillères de l'Amérique du Sud; par* H. A. Weddell, M.D., etc. etc. Livraison II., 6 plates. 4to. Paris, 1855.

We have here the second Fasciculus of this charming work, with the same complement of well-executed plates as the former Fasciculus, by Riocreux, and often two and even three distinct plants upon one plate. With such admirable figures and analyses, brief characters and descriptions suffice; and they are worked out with great care. The *Compositæ* are here continued, and all published in the present number belong to the two groups which are so extensively represented in the South American Andes, the *Mutisiaceæ* and the *Nassauviaceæ*. The illustrations given are, Tab. VII., *Onoseris hastata*, Wedd. Tab. VIII., *a*, *Tylloma splendens*, Wedd.; *b*, *Bichenia reptans*, Wedd. Tab. IX., A, *Oriastrum pusillum*, Pœp. et Endl.; B, *Egania acerosa*, Remy. Tab. X., A, *Perezia cærulescens*, Wedd.; B, *Chabræa laciniata*, Wedd. Tab. XI., A, *Nassauvia revoluta*, Gill.; B, *Nassauvia spicata*, Remy. Tab. XII., A, *Nassauvia Remyana*, Wedd.; B, *Caloptilium Lagascæ*, Hook. et Arn.

Tuinbouw; Flora *van* Nederland *en zijne Overzeesche Bezittingen*, etc., *door* W. H. de Vriese. Vol. II. Leyden. 8vo, many Plates, coloured and plain. 1855.

We gave a favourable account of the first volume of this Work at page 96 of one of our early numbers for last year. The regular continuance of it through a second year is a sure sign of its being favourably received by the public; and no wonder, for it supplies a great amount of valuable information bearing upon Horticulture and Botany. Many of the plates are beautifully executed: we particularly allude to *Bilbergia Rohaniana*, De Vriese; a new *Phlox*, etc.; but there are some of another school, which are very inferior, viz. two Lilies, *Lilium coridion*, Sieb. et De Vriese, and *L. partheneion*, Sieb. et De Vriese, and *Fuchsia robusta*, Tengberg. Some botanical landscapes, which are copied from contemporary works, and which represent a Peruvian-Bark forest, the natural bridge of *Ficus elastica* in the Khasia mountains, and the scene on the Tambur River, Eastern Nepal, are very well reproduced. We are sorry our ignorance of the Dutch language prevents our profiting more from the copious descriptive matter in the pages.

Decades of Fungi; *by the* Rev. M. J. Berkeley, M.A., F.L.S.

Decades LVII.–LVIII.

(With Plates V., VI., IX., X.)*

Rio Negro Fungi.

(*Continued from p.* 177.)

561. *P.* (Pleuropus) *semiclausus*, n. s.; pileo rigido coriaceo flabelliformi sublobato umbrino zonis brunneis picto subsericeo, margine acuto; stipite laterali compresso; hymenio pallido; poris ocellatis; contextu ferrugineo. Spruce, n. 56, 200.

Hab. On decaying trunks. Panuré. February, 1853.

Pileus 2–4½ inches across, rigid, coriaceous, deep umber, slightly lobed, marked with many concentric zones, obscurely silky, lineato-rugose; substance ferruginous. Stem lateral, elongated or almost obsolete, very variable in length and thickness, umber, pruinose. Hymenium pale; pores ocellate; trama even or sulcate.

There are three different forms of this species, one with a slender stem and smaller pileus, which is nearly even or rugose; another with a broader pileus and stouter stem; and a third with a pileus attached by an orbicular disc, or even entirely stemless. These all agree in colour, substance, and pores, and I am therefore obliged to consider them as one and the same species. The species is moreover closely connected with *P. brunneo-pictus*, which exhibits the Porotheloid characters of the hymenium more certainly. In the present case the structure is the same, but every part of the hymenium does not show it equally.

562. *P.* (Pleuropus) *variabilis*, n. s.; pileo convexo coriaceo ex elliptico reniformi umbrino zonis brunneis picto sublævi; stipite elato umbrino pruinoso; hymenio e plano concavo pallide umbrino; poris papillæformibus. Spruce, n. 57, 183, 207. (Tab. IX. fig. 1.)

Hab. On the ground in woods. February, 1853. Panuré.

Pileus ½–2½ inches across, convex, coriaceous, elliptic, and finally reniform, umber, with very few zones or beautifully banded with brown, nearly even or slightly undulated; substance pale. Stem 4–9 inches high, 1–3 lines thick, umber, pruinose, lateral, passing up to the apex of the pileus so as to leave the border in many cases quite free. Hymenium plane, then convex; papillæ distinct or only marked by wavy furrows, each little area enclosing several pores.

A variable, but very distinct species.

563. *P.* (Pleuropus) *hemibaphus*, n. s.; pileo reniformi suberoso brunneolo radiato-rugoso zonato; stipite valido umbrino pruinoso; hymenio albo concavo; poris minutis punctiformibus; contextu pallido.

HAB. On dead wood. Panuré.

Pileus 3 inches across, corky, reniform, radiato-rugose, opaque, brownish, zoned, zones sometimes impressed; margin nearly entire. Stem 2–2½ inches high, ¾–½ inch thick, thickened at the base, umber, pruinose. Hymenium concave, pearly white, forming a little raised border all round; pores minute, punctiform.

This has the habit of *Porothelium rugosum*, and agrees with it in many of its characters; but the hymenium is very different, and the pileus is not so rugose.

564. *P.* (Pleuropus) *atro-purpureus*, n. s.; pileo reniformi radiato-rugoso sulcato-zonato atro-purpureo subtiliter velutino lineatoque; stipite elongato gracili irregulari fusco; hymenio concavo pallido; poris minutis.

HAB. On the ground. Panuré.

Pileus 1 inch across, reniform, convex, radiato-rugose, purple-black, finely velvety and striate, concentrically furrowed; substance umber. Stem 6 inches high, 1 line thick, rugged, forked at the tip. Hymenium concave, pale; pores minute, $\frac{1}{180}$ of an inch across.

A very beautiful species, of which there is unfortunately but a single specimen.

* *P. lucidus*, Fr. Ep. p. 442. Spruce, n. 48, 67, 79, 172.

HAB. On dead trunks of trees. November, 1852. Panuré.

A common species.

565. *P.* (Pleuropus) *pes-simiæ*, n. s.; pileo furcato digitato crasso rugoso umbrino-laccato, lobis fertilibus subflabelliformibus; stipite crasso cum pileo confluente; contextu intimo umbrino, exteriori albo molliusculo; hymenio obliquo albo; poris punctiformibus. Spruce, n. 212.

HAB. On rotten trunks. Panuré. January, 1853.

Pileus 6 inches long, 5 inches broad, forked below, lobed, the lobes sometimes quite distinct, barren or fertile, sometimes proliferous, rugged, dark umber-brown, strongly laccate but not shining; margin of lobes barren, from which, at an obtuse angle, projects the true margin of the hymenium, which is darker, and zoned. Stem 1½ inch thick, dilated

upwards, confluent with the pileus, and similar in colour and substance. Hymenium oblique, white; pores punctiform, about 90 to the inch, with thick dissepiments.

This very strange Fungus, which I find it very difficult to describe, is well known to the Indians, who call it "Coatâ-pô," or Monkey's-hand, the Coatâ being a large black monkey. It resembles slightly that form of *P. australis* figured in Annals of Nat. Hist. vol. iii. tab. 8. It appears however to be a good species, though possibly not in its normal form, and at any rate not a form of *P. australis.*

* *P. Leprieurii*, Mont. Ann. d. Sc. Nat. sér. 2, vol. xiii. p. 203. Spruce, n. 202.

HAB. On dead trunks. Panuré.

* *P.* (Pleuropus) *picipes*, Fr. Ep. p. 440.

HAB. On trunks of trees. Panuré and San Carlos. August, 1853.

566. *P.* (Pleuropus) *nephridius*, n. s.; pusillus, tenuis; pileo glabro badio phlebophoro reniformi; stipite brevissimo nigro; poris minutis punctiformibus. Spruce, n. 164, 210.

HAB. On a dead trunk. Panuré, Guia. March, 1853.

Pileus ½–2 inches across, thin, coriaceous, reniform, red-bay, smooth; cuticle behind or over the whole surface, raised into vein-like excrescences. Stem very short, black, sometimes simply disciform. Hymenium pale; pores punctiform.

This is a small species, remarkable for the cuticle being reticulated like that of *A. phlebophorus*, as is the stem.

* *P.* (Pleuropus) *rhipidius*, Berk. Hook. Lond. Journ. vol. vi. p. 319. Spruce, n. 168.

HAB. On wood in forests on the banks of Rio Negro. March, 1853.

There is also a beautiful miniature variety of this species, not two lines broad, from the Amazon.

567. *P.* (Pleuropus) *decolor*, n. s.; carnosulus, albidus, siccus sordide umbrinus, pusillus; pileo flabelliformi glabro; stipite cum pileo confluente; poris mediis subhexagonis; dissepimentis tenuibus. Spruce, n. 47.

HAB. On decayed trunks. Panuré.

Pileus 1 inch long, ¾ of an inch wide, rather fleshy, whitish, dirty umber and rigid when dry, then smooth, nearly even. Stem short, confluent with the pileus; pores subhexagonal, $\frac{1}{50}$ of an inch across when fresh; dissepiments very thin; edge minutely granulated.

A delicate species, approaching *Favolus* in characters.

* *P.* (Pleuropus) *sanguineus*, Fr. Ep. p. 444. Spruce, n. 187, 46.

Hab. The commonest Fungus on logs, in newly cleared ground, and near the houses. Panuré. February, 1853.

No. 46 is a bleached form, on dead stems of *Alpinia aromatica*.

* *P.* (Pleuropus) *mutabilis*, Berk. in Ann. of Nat. Hist. 1853. Spruce, n. 173, 176, 30.

Hab. On dead wood. Panuré.

In 176 the edge is so thin as to be reduced to the cuticle, which is lacerated, insomuch that the pileus appears ciliated.

* *P.* (Pleuropus) *luteus*, Nees, Act. Nov. vol. xiii. t. 4, fig. 2. Spruce, n. 19.

Hab. On dead wood. Panuré. December.

568. *P.* (Pleuropus) *porphyritis*, n. s.; tenuis coriaceus; pileo flabelliformi ochraceo-zonato purpurascente, margine tenui; stipite brevi subconcolore; hymenio pallido; poris minutis. Spruce, n. 182.

Hab. On dead trunks. Panuré. March, 1853.

Pileus 2 inches or more across, thin, coriaceous, flabellate or subreniform, very minutely tomentose, repeatedly zoned, tinged here and there with purple. Stem $\frac{1}{3}$ of an inch high, subcylindrical, attached by an orbicular disc, inclining to tawny, smooth. Hymenium pallid; pores minute, subangular; substance pale.

Allied to *P. luteus*, etc., but very different in colour and habit; almost the whole of the upper surface is more or less tinged with purple. Sometimes the pileus is elongated.

569. *P.* (Merisma) *polydactylus*, n. s; pileo suberoso polydactylo umbrino zonis brunneis picto subvelutino, loborum apicibus orbiculari-dilatatis; hymenio albo; poris parvis subangulatis. Spruce, n. 59.

Hab. Amongst the roots of trees. Panuré.

Hard, corky. Pileus continuous, with the deeply rooting stem two to three times forked, so as to form fan-like divisions, the tips dilated, and forming beneath orbicular discs; umber-brown, fasciated to the base, minutely velvety. Hymenium white; pores small, $\frac{1}{150}$ of an inch, slightly angular.

This very curious species is certainly no monstrous form of any other in the collection; the dilated hymenia are very peculiar, resembling somewhat the expansions on the feet of the Gecko. With the exception of the hymenium, the lower part is fasciated like the upper.

570. *P.* (Anodermei) *nivosus*, n. s.; pileo crassiusculo convexo pos-

tice attenuato nivoso glabro azono; hymenio albido; poris minutis angulatis dissepimentis tenuibus. Spruce, n. 192.

HAB. On dead wood. Panuré. February, 1853.

Pileus 2 inches across, convex, moderately thick, attenuated behind, snow-white, smooth; substance white. Hymenium slightly discoloured; pores angular, minute, $\frac{1}{130}$ of an inch across; dissepiments thin; edge entire.

Distinguished by its snow-white, smooth pileus.

571. *P.* (Anodermei) *armeniacus*, n. s.; armeniacus; pileo dimidiato subconvexo crassiusculo rugoso tomentoso; hymenio concolori; poris minutis subpunctiformibus, acie subintegra. Spruce, n. 39, 191.

HAB. On dead trunks. Panuré.

Pileus $2\frac{1}{2}$ inches across, dimidiate, slightly convex, rugose, minutely downy, pale apricot-coloured, moderately thick. Stem none. Hymenium of the same colour as the pileus; pores minute, $\frac{1}{140}$ of an inch across, subpunctiform; edge nearly entire; substance tolerably compact.

572. *P.* (Anodermei) *detritus*, n. s.; albus; pileo convexo e pruinoso glabrato sulcato-zonato; hymenio planiusculo; poris minutis punctiformibus. Spruce, n. 43, 49, 191.

HAB. On dead wood. Panuré.

Pileus 2 inches or more across, convex, sometimes ungulate, pruinose, at length smooth with a satiny lustre, concentrically sulcate. Hymenium sometimes slightly concave, but plane in the most perfect specimens; pores distinct, punctiform; edge obtuse.

Mr. Spruce compares the most perfect form with No. 43, and I cannot distinguish them, though there is some slight difference. Taking No. 49 to be the type, the species is allied to *P. ochroleucus*, Berk. I am the rather inclined to think them identical because *P. anebus*, Berk., is perfectly analogous.

573. *P.* (Anodermei) *endothrix*, n. s.; ungulato-subimbricatus; pileo extus badio fibroso velutino, intus zonato, fibroso-spongioso umbrino; hymenio griseo; poris parvis dentatis.

HAB. On the pales of Mr. Spruce's orchard. San Carlos.

Pileus 2 inches or more across, $1\frac{1}{2}$ inch long, ungulato-subimbricate, very light, fibroso-velvety above, zoned within, consisting of an intricate mass of fibres, mixed with finer, umber, spongy tissue. Hymenium grey, with a purplish tint; pores small, $\frac{1}{70}$ of an inch across, shallow, toothed; dissepiments rather thick, rigid.

With the habit of *Trametes hydnoides*, but allied to *P. trichomallus*, *funalis*, etc., from all of which it is very distinct.

574. *P.* (Placodermei) *petalodes*, n. s.; subcarnosus; pileo cuneato-flabelliformi castaneo zonato lineato rugoso; hymenio umbrino; poris angulatis, dissepimentis tenuibus, contextu albo. Spruce, n. 36.

Hab. On dead trunks. Panuré.

Pileus 3 inches across, 2 long, much attenuated behind, petaliform, red-brown, with numerous zones, rough, with multitudes of raised, radiating lines, smooth; substance white. Hymenium umber; pores minute, $\frac{1}{100}$ of an inch across, angular; dissepiment thin. In some lights the hymenium has an olivaceous tint.

A very beautiful species, allied to *P. zonalis;* both are extremely rigid. This is somewhat carnose when fresh, as is probably the case with *P. zonalis.*

* *P.* (Placodermei) *zonalis*, Kön. Ann. Nat. Hist. vol. x. p. 375. Spruce, n. 68, 208.

Hab. On decayed trunks. Jauarité Cachoeira. Panuré.

575. *P.* (Placodermei) *martius*, n. s.; pileo pulvinato dimidiato atro-sanguineo zonis pallidis notato glabro; contextu pallido senectute umbrino; hymenio pallido; poris punctiformibus.

Hab. On dead wood. Panuré.

Pileus 3 inches across, pulvinate, dimidiate, nearly even, smooth, deep black-purple, with pallid zones; substance pale, in age umber. Hymenium concave, pallid, umber when old; pores minute, punctiform.

A very singular species, remarkable for its peculiar colouring and minute pores, which separate it at once from *P. vulneratus*, Lév.

* *P.* (Placodermei) *fasciatus*, Fr. Ep. p. 471. Spruce, n. 58, 171.

Hab. On decayed trunks. Panuré.

* *P.* (Placodermei) *australis*, Fr. Ep. p. 464. Spruce, n. 570.

Hab. On trunks of trees. Panuré.

* *P. igniarius*, Fr. Ep. p. 466. Spruce, n. 213.

Var. *resupinatus*.

Hab. Panuré. January, 1853.

Altogether resupinate, extending a foot or more in length over the surface of the wood, with the border almost perpendicular, the surface here and there rising into rounded hills with deep valleys: sometimes weighing a stone.

* *P.* (Placodermei) *senex*, Mont. Ann. d. Sc. Nat. sér. 2, vol. v. p. 70. Spruce, n. 61.

Hab. On decayed trunks. Panuré.

576. *P.* (Placodermei) *scalaris*, n. s.; durissimus; pileo atro-purpureo scabro tomentoso sulcato-zonato scalari-triquetro; contextu spadiceo; hymenio rufo-umbrino; poris minimis punctiformibus stratosis, acie planâ. Spruce, n. 62, 199.

Hab. On dead trunks of trees. February, 1853. Panuré.

Pileus 2½ inches across and 2 inches long, dimidiate, rising in several stages, sulcato-zonate, extremely hard, atro-purpureous, clothed with very short pubescence, collected in little scabrous tufts. Hymenium concave, reddish-umber; pores punctiform, with flat interstices; substance rich red-brown.

Allied to *P. phœus*, and remarkable for its rich black-purple tint, scabrous surface, and reddish-umber hymenium.

576*. *P.* (Placodermei) *inflexibilis*, n. s.; pileo ungulato brunneo cristato-sulcato durissimo; contextu ferrugineo; hymenio umbrino; poris punctiformibus. Spruce, n. 52, 181.

Hab. On dead trunks. Panuré.

Pileus 2 inches across, deeply sulcate, the interstices crested and singularly recurved.

This species has hitherto occurred only in Borneo.

* *P.* (Placodermei) *licnoides*, Mont. Ann. d. Sc. Nat. sér. 2, vol. xiii. p. 204.

Hab. On dead trunks. Panuré.

577. *P.* (Placodermei) *atro-umbrinus*, n. s.; durus pusillus; pileo ungulato atro glabro striato-rugoso subzonato; contextu umbrino; hymenio concavo umbrino; poris minutis ocellatis stratosis.

Hab. On dead wood. Rio Negro.

Pileus ½–1 inch across, ungulate, black, slightly zoned, marked with minute, radiating, smooth, thinly laccate wrinkles; substance bright umber-brown, corky, zoned. Hymenium concave, umber; pores minute, punctiform, $\frac{1}{200}$ of an inch across; interstices depressed, orifice raised, edged with white, stratose.

A small and delicate species, which has no close ally.

* *P.* (Inodermei) *caperatus*, Klotzsch, Ann. of Nat. Hist. vol. iii. p. 391. Spruce, n. 23.

Hab. On dead trunks. Panuré.

578. *P.* (Inodermei) *aculeans*, n. s.; tenuis rigidus coriaceus; pileo dimidiato subflabelliformi brunneo zonato radiato aculeato subsericeo; contextu umbrino; hymenio albo; poris punctiformibus. Spruce, n. 188.

HAB. On dead wood. Panuré.

Pileus 2 inches across, $1\frac{1}{3}$ long, dimidiate, subflabelliform, thin, rigid, coriaceous, brown with darker zones, rough with radiating raised processes, with a slight silky lustre; edge acute, paler, passing into white; substance brownish, umber. Hymenium white; pores punctiform, $\frac{1}{100}$ of an inch across; edge obtuse.

Allied to *P. caperatus*, but with none of its velvety clothing. The pores in age lose somewhat of their white hue and brown umber.

579. *P.* (Inodermei) *vespilloneus*, n. s.; pileo tenui papyraceo reflexo stygio zonato radiato-lineato subsericeo; hymenio umbrino; poris minutis subhexagonis. Spruce, n. 177.

HAB. On dead trunks on the River Uaupés. February, 1853.

Pileus effused at first, orbicular, then confluent, several inches across, reflexed, thin, flexible, papyraceous, dark brown, zoned, marked with a few radiating lines, slightly silky; extreme edge rufous. Hymenium umber; pores subhexagonal, regular, $\frac{1}{80}$ of an inch across; dissepiments thin; edge entire.

Resembling somewhat *P. caperatus*, but much thinner and more flexible, with regular, subhexagonal pores.

580. *P.* (Inodermei) *xerophyllaceus*, n. s.; pileo tenui rigido coriaceo dimidiato e velutino glabro brunneo zonato rugosiusculo; hymenio brunneolo; poris punctiformibus. Spruce, n. 179.

HAB. On dead wood. Panuré.

Pileus 3–5 inches across, 2 inches long, thin, rigid, coriaceous, rather rugose, sometimes marked with little scabrous elevations, sometimes nearly even, brown, repeatedly zoned, sometimes blotched; edge acute; substance brown. Hymenium brownish; pores punctiform, minute, $\frac{1}{200}$ of an inch across.

This species has many points of resemblance with *P. Hostmanni* and *P. caperatus*, but the pores are far smaller than in either, and from the latter it differs in the velvety down disappearing far sooner: in external appearance it has much resemblance to the former.

* *P.* (Inodermei) *holosclerus*, Berk. Hook. Lond. Journ. vol. vi. p. 501. Spruce, n. 209.

HAB. On dead trunks. Panuré.

This species, when young, is clothed with yellow down like *P. Chrysites*.

* *P.* (Inodermei) *setiporus*, Berk. l. c. p. 505. Spruce, n. 71.

HAB. S. Gabriel.

(*To be continued.*)

Definitions of Rare or hitherto Undescribed AUSTRALIAN PLANTS, *chiefly collected within the boundaries of the Colony of* Victoria; *by* Dr. FERDINAND MUELLER, Government Botanist for the Colony of Victoria.

(*Continued from p.* 169.)

XXXVIII. MYOPORINÆ.

Pholidia, *R. Brown.* (*Sect.* Sentis.)

Leaves alternate. Calyx four-parted. Drupe bony, hard-beaked, with imperfectly divided cells.

138. Pholidia *divaricata*, F. Muell.; twigs spreading, spinescent, glabrous or with a row of white short hairs; axils of the leaves somewhat bearded; leaves glabrous, linear-oblong, blunt, gradually tapering into the base, entire; flowers axillary, solitary, nearly sessile; segments of the calyx narrow-lanceolate, long-acuminate, ciliated; corolla outside starry-velutinous, its upper lip with two very short lobes, lower one three-parted.

HAB. In bushy plains, subject to inundations, on the banks of the Murray River, the Darling, and Murrumbidgee.

An ornamental shrub, several feet high, with purple or white generally spotted flowers.

(*Sect.* Eremicola.)

Leaves alternate, deciduous. Calyx five-parted. Drupe dry, acuminate, with almost entirely divided cells.

139. Pholidia *polyclada*, F. Muell.; glabrous; branches and twigs spreading, not spinescent; leaves linear, somewhat channelled, blunt, entire, sessile; pedicels axillary, solitary, upwards thickened, longer than the calyx; axils glabrous; segments of the calyx nearly cordate, acuminate, with minute, ear-like appendages at the base, indistinctly ciliate at the margin; corolla outwards glabrous, very wide, surpassing many times the length of the calyx, upper lip bifid, lower one three-parted.

HAB. In sandy, loamy, desert plains at the junction of the Darling and Murray.

A shrub with intricate branches, about six feet high. Flowers large, white.

This species forms an intermediate link between *Eremophila* and *Pholidia*. To the same genus I refer also *Myoporum brevifolium* of Bartling.

XXXIX. Scrophularineæ.

140. Anthocercis *angustifolia*, F. Muell.; all over glandulously pubescent; leaves linear, flat, entire; pedicels of equal length with the calyx; segments of the calyx linear, acutish; laciniæ of the large corolla lanceolate-linear, acuminate, nearly twice as long as the tube.

Hab. In stony glens near Mount Lofty, in South Australia; not frequent.

141. Anthocercis *myosotidea*,* F. Muell.; all over hirtellous, from short, gland-bearing hairs; leaves small, sessile, ovate, blunt, broader towards the base, unequally revolute; pedicels shorter than the hirtellous calyx; segments of the calyx semiovate, blunt, half as long as the tube; corolla half-exserted, with short, blunt lobes.

Hab. In gravelly sand-ridges on the Murray, but rare.

A species next to *A. scabrella*, but well marked by the short blunt corolla.

142. Pæderota *densifolia*, F. Muell.; stems procumbent, cæspitose; leaves thick, perfectly entire, cymbiform-ovate, ciliolate, sessile, densely imbricated in four rows; flowers bibracteate, axillary and terminal, solitary, sessile; corolla twice as long as the calyx, glabrous, pink, the tube inside unbearded; capsule obcordate; seeds oblique-ovate, convex at the back.

Hab. On the highest rocky summits of the Munyang Mountains (6000–6500 feet).

A most remarkable herb, variable in the number of divisions of the corolla, and in their form. Since it does not agree in habit with the European species, it may become the type of a new genus (*Cymbophyllum*).

143. Veronica *Hillebrandi*, F. Muell.; stems short, erect or ascending, all over covered with short reclined hairs; leaves thick, on short petioles, somewhat rough, oblong or hastate-ovate, grossly and remotely serrated, truncate or rarely tapering at the base; racemes corymbose, axillary, few-flowered; bracteas ovate-lanceolate; segments of the calyx lanceolate-oblong; corolla large, white; capsules broad-obcor-

* Of close affinity with *Cyphanthera ovalifolia*, Miers.

date, slightly compressed, glabrous; seeds compressed-ovate, brown, wrinkled.

HAB. On barren ridges along the Coorong, and on limestone rocks around Lake Alexandrina.

144. Euphrasia *alsa*, F. Muell.; dwarf, annual; glandulously downy; leaves sessile, in outline ovate-cuneate, laciniate or pinnatifid; lobes of the leaves oblong or linear, blunt; spikes very short, few-flowered; calyx tubulose-campanulate, the lobes blunt, about as long as the tube; tube of the corolla hardly exserted, of equal length with the limb, the lobes of the lower lip emarginate, of the upper retuse; anthers scantily bearded, the cells of all short and equally spurred; capsule orbicular-ovate, in front densely ciliated, enclosed, much compressed, few-seeded.

HAB. Gregarious on the highest stony summits of the Munyang Mountains (6000 feet).

It differs by its annual root from all other Australian and Tasmanian species, by its almost equally spurred anthers from the European, by the bearded anthers from the South American, and respectively by the same characters from the New Zealand species. *E. Antarctica* and *revoluta* are nearest related to it.

XL. LENTIBULARINEÆ.

145. Polypompholyx *exigua*, F. Muell.; utricles ovate; leaves narrow-lanceolate or oblong, tapering into the petiole; scape filiform, one- to three-flowered; corolla rose-red; lower lip nearly horizontal, trifid, at least three times longer than the upper lip, its segments oblong-linear, blunt, the middle one larger, the lateral ones hardly longer than the spur, upper lip nearly erect, bipartite, with linear-subulate divisions; palate yellow, with an orange margin.

HAB. In mossy, peaty or boggy places at the Grampians, Serra and Victoria Ranges, and in South Australia at Echunga.

It differs from *Polypompholyx tenella* in its larger flowers, as also in the characters already pointed out.

XLI. POLYGONEÆ.

146. Polygonum *diclinum* (Sect. *Avicularia*), F. Muell.; suffruticose, glaucous, perfectly smooth; stems upright, many-branched; leaves linear, at both ends narrowed; stipules short, binerved, entire, smooth, laxly clasping; fascicles axillary, few-flowered; flowers diœcious, oct-

androus and trigynous, greenish, imbricate-bracteolate, cernuous; pedicels shorter than the five-parted, glandless calyx; caryopsis subglobular-trigonous, shining black, hardly rugulose.

Hab. On shifting sand-hills at the junction of the Murray and Murrumbidgee, and rarely at the Mitta Mitta.

XLII. Chenopodiaceæ.

147. Blitum *atriplicinum* (Sect. *Orthosporum*), F. Muell.; stems numerous, prostrate, simple, hardly streaked; leaves grey-green on both sides, alternate, petiolate, much spreading, hastate- or ovate-lanceolate, the upper ones narrow-lanceolate, all acute, tapering into the base, glabrous with evanescent papillæ; flowers densely glomerate; fruit-bearing calyx wingless, not baccate, imperfectly closed; lobes near the base gibbous; seeds hardly keeled, with a densely papillose pericarp.

Hab. In saline plains on the Rivers Murray and Darling, as also towards Lake Torrens.

148. Anisacantha *Kentropsidea*, F. Muell.; diffuse; much branched, all over villose-tomentose; leaves nearly flat, linear, acute; calyx tomentose, short, above the middle aristate; awns two, short, thin, nearly equal.

Hab. In the Murray and Darling Desert.

It resembles *Kentropsis diacantha*.

149. Anisacantha *bicuspis*, F. Muell.; much branched; leaves crowded, trigono-semiterete, acute, glabrous; calyx villose-pubescent, long, below the middle aristate; stamens five; anthers exserted; awns two, strong, somewhat unequal.

Hab. In saline plains in the neighbourhood of Lake Torrens.

150. Anisacantha *tricuspis*, F. Muell.; branches glabrous, streaked; leaves crowded, semiterete, acute, glabrous; calyx short, tomentose at the summit, above the middle aristate; awns three, unequal.

Hab. On the subsaline and sandy banks of the Murray River, subject to inundations.

Next to *A. erinacea*.

151. Anisacantha *quinquecuspis*, F. Muell.; branchlets glabrous, streaked, divaricate; leaves glaucous, nearly flat, lanceolate-linear, acute, glabrous; calyx short, villose-tomentose at the summit, above the middle aristate; styles three; awns five, very unequal.

Hab. In sandy, loamy plains near the junction of the Darling and Murray Rivers.

Allied to *A. muricata.*

152. Kochia *sedifolia*, F. Muell.; velvety from a pale grey toment; stem fruticose, erect, with numerous spreading branchlets; leaves short, crowded, alternate, clavate-semiterete, blunt; flowers generally solitary; wings of the calyx nearly glabrous, hardly longer than its velutinous disc, veined, flabellate, nearly all connate, at last red.

HAB. On the limestone banks of the Murray and Darling Rivers, and in dry, subsaline places towards Spencer's Gulf and Lake Torrens.

It differs from *K. brevifolia* not only in much more spreading growth, but also essentially in its velvet indument and in the partially separated wings.

153. Kochia *oppositifolia*, F. Muell.; covered with a grey, somewhat silky toment; stem dwarf, spreading, much branched; leaves short, opposite, generally crowded, triquetrous, acute, with nearly carinate backs; flowers mostly solitary; wings of the calyx glabrous, hardly longer than the thinly tomentose disc, veined, red, orbicular- or flabellate-reniform, disjointed.

HAB. In various saline places at Spencer's Gulf.

The opposite leaves distinguish it at once from the numerous other species.

XLIII. SANTALACEÆ.

154. Choretrum *chrysanthum*, F. Muell.; branches terete; twigs angular, not pungent; leaves almost persistent, lanceolate-subulate, at length somewhat deltoid; glomerules yellow, two- to five-flowered, on the top of lateral very short twigs; bracteoles three, subovate or roundish, ciliolate.

HAB. On low, scrubby ridges along the Avoca and Murray Rivers.

Not dissimilar to *Choretrum glomeratum*, from which, as well as from the few other already known species, it is easily distinguished by its golden flowers.

XLIV. PROTEACEÆ.

155. Grevillea *Victoriæ* (Sect. *Calothyrsus*), F. Muell.; tall; leaves subcoriaceous, undivided, long-lanceolate, rarely ovate, acute, short-mucronate, gradually tapering into the petiole, penninerved, veined, with slightly recurved margin, above smooth, beneath with branchlets and rachis grey-silky; racemes pedunculate, axillary and terminal, elongate, sometimes divided, drooping, their development centripetal; ca-

lyces three times longer than the pedicel, outside rutilous, silky, inside, below the middle, white-bearded; style long, exserted, glabrous or scantily hairy at the extremity; germen stalked, glabrous; stigma sublateral, ovate, slightly umbonate; follicle ellipsoid, thinly ribbed, glabrous.

HAB. Along the waters of the Buffalo Range, on the summits of Mount Buller and Mount Tambo, on the sources of the Mitta Mitta, at Mount Hotham and Mount Latrobe.

A truly majestic plant, when, by descending into the valleys, it assumes a height of twelve feet and more. In higher altitudes it becomes a dwarfer bush, with shorter, almost ovate leaves.

156. Grevillea *dimorpha* (Sect. *Calothyrsus*), F. Muell.; diffuse; branches angulate; leaves coriaceous, undivided, long, lanceolate or linear, acute, callously mucronate, almost sessile, trinerved, above smooth, on the recurved margins and the lateral nerves somewhat scabrous, beneath grey-silky; racemes fascicular, on very short peduncles; calyx almost three times longer than the pedicels, outside rutilous-silky, inside at the middle white-bearded; style long, exserted, together with the germen and its stipes perfectly smooth; stigma lateral, ovate, centrally umbonate.

Var. α, *latifolia;* leaves ovate or narrow-lanceolate, 2–4″ long, 4–8‴ broad, rarely broader.

Var. β, *angustifolia;* leaves elongate, linear, 2–4″ rarely 6″ long, 1–1½‴ broad.

HAB. In the Grampians, Serra and Victoria Ranges, in barren, rocky places.

This splendid species bears much affinity to *Grevillea Victoriæ;* it is however readily distinguished by its thicker, subsessile, generally narrower leaves, with a distinct marginal, scabrous nerve, by its short racemes on an abbreviate peduncle, with rusty-brown rachis, by its smaller flowers, barbate inside nearly up to the limb, and finally by smaller follicles tapering into a longer stipes.

It flowers in the spring, not, as *Grevillea Victoriæ*, in the autumn.

157. Grevillea *Miqueliana* (Sect. *Lissostylis*), F. Muell.; erect; branches terete; leaves large, subcoriaceous, petiolate, lanceolate or oblong-ovate, entire, on the margin hardly recurved, above dotted-scabrous, beneath as well as the branches and rachis tomentose, pubescent, penninerved, and net-veined; racemes short, dense, many-

flowered, pedunculate, drooping, with centripetal development; flowers after the anthesis reclinate; calyx four or five times longer than the pedicel, red, externally grey-downy, inside below the middle white-bearded; style exserted, towards the summit puberulous, at last smooth; germen stalked, glabrous; stigma sublateral, ovate, a little umbonate; follicle oblique-ovate.

Hab. On the crest of the sterile wooded ranges near Mount M'Millan, and along the upper valleys of the Avon in Gipps' Land.

This rare and handsome species has been dedicated to the illustrious botanist Miquel, who, as he participates in the labours to elucidate the Australian plants, is so well entitled to this distinction.

158. Grevillea *confertifolia* (Sect. *Lissostylis*), F. Muell.; diffuse; twigs pubescent; leaves crowded, linear-subulate, even, short-mucronate, above smooth, beneath with the innovations silky; margins refract to the middle nerve, which is prominent on both sides; fascicules of flowers sessile, terminal, concealed by the leaves; calyx outside and its pedicel grey-silky, inside at the middle densely bearded; pistil hardly half an inch long, smooth, exserted; germen stipitate; stigma ovate, oblique-terminal, with central papilla.

Hab. On the subalpine summit of Mount William, and on rocky ridges towards Mount Zero.

This species resembles *Grevillea juniperina* and *G. riparia* (R. Br. Prodr. 377).

159. Grevillea *lobata* (Sect. *Eugrevillea*), F. Muell.; high, upright, many-branched; twigs spreading, angular, covered with a very thin, whitish indument; leaves in shape ovate, deeply laciniate, venose, with hardly recurved margin, contracted by a wedge-shaped basis into the stalk, above pale green, glabrescent, beneath tomentose, as are the branches; segments two or three on both sides, distant, lanceolate, mucronate, entire, rarely teeth-bearing; racemes dense, ovate, many-flowered, at length drooping; calyx outside as well as pedicels and rachis grey from an appressed indument, inside smooth; style long, exserted, with exception of the base smooth; hypogyne gland very short; stigma oblique-lateral, broad-ovate, centrally umbonate; germen and its stipes white-tomentellous.

Hab. In the desert along the Murray River, from Swan Hill to the westward.

Nearest to *Grevillea ilicifolia* (R. Br. Suppl. p. 21), but much taller,

upright, tomentum white, shineless, not silky, leaves deeper divided with distant segments, and flowers more numerous.

160. Grevillea *pterosperma* (Sect. *Cycloptera*), F. Muell.; upright; branches strict, holosericeous; leaves glaucous, somewhat rigid, narrow-linear, elongate, undivided or bitrifid, glabrescent, ending in a sphacelate mucrone, above convex, and manifestly striated; margins refract to the middle nerve, which beneath is very prominent; racemes alternately crowded at the end of the branches, elongate, dense-flowered; calyx outside, with pedicels and rachis, grey-pubescent, inside, together with the style, smooth; germen stipitate, tomentose; stigma ovate, oblique-terminal, centrally umbonate; folliculi globose-ovate, turgid, hardening, with short stipes, grey-tomentellous; seeds flat, ovate, even, all round winged with a thin membrane.

HAB. In the Mallee Scrub on sand-hills towards the junction of the Murray and Murrumbidgee.

Allied to several tropical species, particularly to *G. angustata* (R. Br. Suppl. p. 24).

161. Orites *lancifolia** (Sect. *Acroderris*), F. Muell.; leaves oblong-lanceolate, flat, glabrous, blunt, net-veined, perfectly entire; spikes axillary and terminal, sub-solitary; calyx smooth; germen silky-downy; follicle silky.

HAB. On the rocky summits of the Australian Alps, 5000–6000 feet high; for instance, on Mount Wellington, Mount Hotham, Mount Latrobe, in the Munyang Mountains, in the upper valleys of the Mitta-Mitta, etc.

This fine shrub is, besides *Grevillea Victoriæ*, the only really alpine species of this Natural Order, endemic, in the Australian continent. But I am uncertain whether it may prove to be identical with *O. Milligani*, of which no description has been hitherto given.

XLV. STACKHOUSIACEÆ.

162. Tripterococcus *spathulatus*,† F. Muell.; smooth, stems branched, ascendent; branches almost terete, streaked, foliate; leaves fleshy, oblong or obovate-spathulate; flowers nearly sessile; unguis of the petals longer than their lamina; style tripartite.

HAB. On the rocky and sandy shores of Wilson's Promontory, of Rivoli Bay, and Lake Alexandrina.

* This is probably a state of *Orites diversifolia*, Br.—ED.
† *Stackhousia maculata*, Sieb.—ED.

163. Stackhousia *pulvinaris*, F. Muell.; depressed, with numerous intricate rooting branches, perfectly smooth; leaves somewhat fleshy, oblong or spathulate-linear, nearly blunt; flowers solitary on the summit of very short branchlets; bracteoles twin, as long or longer than the pedicel; flowers yellow; three of the stamens longer than the two others; anthers glabrous; style deeply bi- or trifid.

HAB. On the highest summits of the Australian Alps, where, saturated with moisture, the widely expanded tufts, decorated with fragrant, starry flowers, form a beautiful carpet; 5000–7000 feet.

As a species it connects the Tasmanian *S. flava* with *S. minima*, from New Zealand.

XLVI. EUPHORBIACEÆ.

164. Trachycaryon *Klotzschii*, F. Muell.; leaves opposite, very short-stalked, ovate-lanceolate, acute, irregularly crenately toothed, serrate or repand, above smooth or imperfectly puberulous, beneath grey-velutinous, at the base of the petiole on both sides furnished with one or two small, stipitate glands; female flowers apetalous; sepals ovate, subacuminate; styles free, hardly bifid to the middle; capsules verruculose, ovate-globose, slightly impressed at the sutures; seeds grey, ovate, shining.

HAB. On sand-hills near Corner Inlet, and in various localities in South Australia.

165. Trachycaryon *Cunninghamii*, F. Muell.; leaves alternate, in circumference lanceolate-ovate or heartshaped, short or deep trifid, smooth or below tomentose, irregularly and coarsely serrate, at the base truncate or rounded, with acute lobes and teeth, on the base of the petiole furnished on both sides with one or two large stipitate glands; female flowers apetalous; sepals lanceolate, acuminate; styles free, deeply bifid; capsules subglobose, not furrowed at the sutures; seeds spotted.

Var. α, *tomentosum;* leaves short-stalked, below as well as the twigs and capsules tomentose; bracts and sepals ciliate.

Var. β, *glabrum;* leaves long-stalked, as well as the capsules, sepals, and bracts, smooth.

HAB. Between granite rocks and on the sandy banks of the Snowy River.

To var. α belongs probably *Adriana acerifolia* of Allan Cunningham, and to β, *A. heterophylla* of Sir William Hooker.

166. Trachycaryon *Hookerii*, F. Muell.; leaves alternate, long-petiolate, lanceolate-oblong, gradually narrowed into the base, acute or obtuse, smooth or grey-velutinous, irregularly crenate-toothed or bluntly lobed, at the base of the petiole on both sides beset with a small gland; female flowers apetalous; sepals ovate-lanceolate, acute; styles at the base connate, deeply bifid; capsule trigastrous, glabrescent.

Var. *α*, *velutinum;* leaves above thinly, below, together with twigs and flowers, thicker velutinous.

Var. *β*, *glabriusculum;* leaves on both sides smooth, twigs and flowers glabrescent.

HAB. On sand-ridges along the Murray, towards the junction of the Darling and the Murrumbidgee.

167. Beyeria *opaca*, F. Muell.; smooth; twigs compressed, yellowish-green; leaves narrowly or linear-oblong, rounded-blunt, gradually narrowed into the base, hardly viscous or shining, with flat or slightly recurved margins, above light, beneath pale green; pedicels of subequal length with the calyx; capsules ovate-globose, hardly furrowed at the sutures; seeds shining, variegated, with a thick caruncula.

HAB. In the Mallee Scrub, between Lake Lalbert, Lake Tyrrell, and the Murray River.

168. Phyllanthus *trachyspermus*, F. Muell.; annual, smooth, glaucous; stem upright, branched; branches angular; leaves imbricate, deciduous, oblong, obtuse, on very short petioles; pedicels solitary, very short; sepals lanceolate-acute, much shorter than the capsule, with broad, membranaceous margins; stigmata very small; capsula subglobose, smooth, drawn out into an umbonate apex; seeds large, livid, acute, triangular, at the internal angle deeply excavate, on the sides and back rugosely asperate.

HAB. On places subject to inundations at the junction of the rivers arling and Murray.

(*To be continued.*)

BOTANICAL INFORMATION.

ENSETE *of Bruce.*

In 1853 our valued correspondent, Walter Plowden, Esq., H. B. M. Consul at Massowah, Abyssinia, did us the favour to send us seeds,

and a few perfect fruits, under the name of "*Ansett*," of a species of Banana, much used as an article of food in Abyssinia; yet it is not, as in other countries, the fruit which is eaten, but the stem or trunk. The fruit indeed is small (compared with other Bananas or Plantains), rather pyriform than oblong, with a very uneven surface, varying in shape according to the number of seeds within, including little or almost no pulp, and terminated with the withered floral coverings. The seeds are nearly as large as small chestnuts, and so unlike what we had believed those of any *Musa* to be, that but for Mr. Plowden's authority we should not have believed them to be of that genus. However, as Banana-seeds we planted them, and Bananas they proved, very different certainly from *Musa paradisiaca* or *M. sapientum*, and clearly the *Ensete* of Bruce's Travels (see English ed. 8vo. vol. vii. p. 149, and Atlas, Tables 8 and 9). This *Ensete* is a plant totally unknown in botany or in books, save from what Bruce has written about it. No specimen or any further information seems ever to have come to Europe till now. Gmelin indeed has (Syst. Nat. p. 567) been pleased to call it *Musa Ensete*, and given a brief but most unsatisfactory character, entirely drawn from Bruce's figure; but Bruce himself stoutly maintained that "any one who would consider it a species of *Musa*, does so without any sort of reason." Yet the chief characteristics he gives to prove it is not a Banana or Plantain—for these were the only *Musas* known to Bruce—are marks common to both.

Though a *Musa*, without doubt however, Bruce, both in his figure and description, represents enough to prove that his *Ensete* is very different, specifically, from the common *Musas;* and our plants, now 4–6 feet high, further prove it to be so. We shall anxiously watch for the fructifying of our plants, and in the meantime we will give all that is worth extracting from Bruce's history, and then notice its affinity with some more recently discovered Indian species. The *Ensete** is considered to be "a native of Naree, and to grow in the great swamps and marshes in that country, formed by rivers rising there, which have little level to run to either ocean. It is said that the Galla, when they migrated into Abyssinia, brought for their particular use the Coffee-tree and the *Ensete*, the use of neither of which was before known. The

* Not *Enseté*, as printed in the 'Nouv. Dict. des Sciences Naturelles,' as is proved by Mr. Plowden writing the word *Ansett*, which would give a nearly similar pronunciation to *Ensete*.

general opinion indeed is that both are naturally produced in every part of Abyssinia, provided there is heat and moisture. It grows and comes to great perfection at Gondar, but it most abounds in that part of Maitsha and Goutto west of the Nile, where there are large plantations of it, and is there, almost to the exclusion of anything else, the food of the Galla inhabiting that province. Maitsha is nearly upon a dead level, and the rains have not slope to get off easily, but stagnate, and prevent the sowing of grain. Vegetable food would therefore be very scarce in Maitsha were it not for this plant."

We have already said that the fruit of the *Ensete* is not eatable; the one to three large seeds occupy almost the entire fruit, and by their size give the unequal form to the exterior of it. But the stem or trunk, as soon as it has attained its full size, before it becomes hard and fibrous, is eatable, and excellent, and when boiled it has the taste of the best new wheat-bread not perfectly baked. "When you make use of the *Ensete* for eating, you cut it immediately above the root, and perhaps a foot or two higher as the plant advances in age. You strip the green from the outer part till it becomes white; when soft, like a turnip well boiled, if eat with milk or butter, it is the best of all food, wholesome, nourishing, and easily digested."

"We see," says Bruce, "in some of the Egyptian antique statues the figure of Isis sitting between the branches (foliage?) of the Banana-tree, as it is supposed, and some handfuls of ears of wheat; you see likewise the hippopotamus ravaging a quantity of Banana-trees. But the (true) Banana is not a plant of the country, and could never have entered into the list of their hieroglyphics; for this reason it could not figure anything permanent or regular in the history of Egypt or its climate. I therefore imagine that this hieroglyphic was wholly Ethiopian, and that the supposed Banana, which, as an adventitious plant, signifies nothing in Egypt, was only a representation of the *Ensete*, and that the record in the hieroglyphic of Isis and the *Ensete*-tree was something that happened between harvest and the time the *Ensete*-tree came to be in use, which is in October. The hippopotamus is generally thought to represent the Nile, that has been so abundant as to be destructive. When therefore we see upon the obelisks the hippopotamus destroying the Banana, we may suppose it meant that the extraordinary inundation had gone so far as not only to destroy the wheat, but also to retard or hurt the growth of the *Ensete*, which was to supply its

place. I do likewise conjecture that the bundle of branches of a plant which Horus Apollo says the ancient Egyptians produced as the food on which they lived before the discovery of wheat, was not the *Papyrus*, as he imagines, but this plant, the *Ensete*, which retired to its native Ethiopia upon a substitute being found better adapted to the climate of Egypt."

So much for the classical history of the *Ensete;* to which we may add that Mr. Stackhouse,* in his 'Commentary on Theophrastus,' suspects that Bruce's *Ensete* may be the *Mnasium* of that author, eatable like *Papyrus* and of a sweet taste, which others consider to be the *Cyperus esculentus* (see Spreng. Hist. Rei Herb. i. p. 78).

As a species, we may observe that Bruce seems to have taken great pains with his figures, and that, as far as foliage is concerned, they accurately represent our plant; and we may observe that, independent of inflorescence, the *Ensete* has a near affinity with the *Musa superba*, Roxb. Corom. F. vol. iii. tab. 223, and Hook. Bot. Mag. tab. 3849, 3850, of the Southern Peninsula of India; but the arrangement of the flowers on the spadix and the bracteal scales, as well as the seeds, rather than the fruit, are considerably different. The seeds in our own specimens are much larger, and we do not find more than from one to three in each fruit (Bruce describes only one), whereas in *M. superba* there are numerous seeds, arranged in two rows in each of the three cells. Again, the inflorescence, as represented by Bruce, almost exactly resembles that of Roxburgh's *Musa glauca* (Pl. Corom. iii. tab. 300), a native of Pegu, but the stem and foliage are considerably different, and the latter of a remarkably glaucous hue, as indicated by the specific name; whereas our plant has bright yellow-green leaves, and the costa purple on the under side. The fruit also very much resembles that of our plant in size and general form, but the seeds are smaller and more numerous. Both these new Musas of Roxburgh are seed-bearing, and the fruit is scarcely pulpy, and not eatable, and they produce no suckers from the root, as is probably the case with the *Ensete*.

* Mr. Stackhouse's note on the *Mnasium* of Theophrastus is as follows:—"Nullus dubit quin pl. Ægypti a D. Bruce descripta et delineata sub nomine '*Ensete*' (*vide* App. p. 36) hic referenda sit. Dempta terminatione Græca *ον*, voces Mnasi, Ansi, haud absimiles, et usus plantæ ad victum humanum idem"! (Theophrastus de Historia Plantarum, curante Joh. Stackhouse, Oxonii, 1813, vol. i. p. 207.)—"To clench the proof," adds my friend Mr. Bennett, who sent me the extract from the British Museum, "he (Mr. Stackhouse) gives a reduced copy of Bruce's figure, and places it opposite to Theophrastus's account of *Mnasium* at p. 174."

Bruce mentions the fact of the stem of the *Ensete* being *perennial;* in that respect differing remarkably from the common Bananas, which die immediately after ripening their fruit. The plant from which Bruce's drawings were made, he assures us, was ten years old.

NOTICES OF BOOKS.

GÉOGRAPHIE BOTANIQUE RAISONNÉE, *ou Exposition des Faits principaux et des Lois concernant la Distribution Géographique des Plantes de l'époque actuelle; par* M. ALPH. DE CANDOLLE. 2 vols. 8vo. Paris.

(*Continued from p.* 191.)

The question whether islands have fewer or more species than equivalent areas on continents, has long occupied the attention of naturalists, Von Buch holding that they have fewer, Schouw that they have more. M. de Candolle finds, as was to have been anticipated, that the extent of insular Floras varies with their proximity to the great continents. When so close that they may be regarded as almost a part of a continent, as Tasmania is of Australia, or Ceylon of the peninsula of India, there is no marked difference between the numerical proportions of the insular and continental Floras; but in the case of islands far removed from continents, their Floras are generally very poor in species, except those in the northern regions.

Under conjectural estimates of the total number of flowering plants on the surface of the globe, M. de Candolle enters into an extremely careful and close analysis of all the materials within his reach, and arrives at the conclusion that the number may be about 250,000, using the term species in the sense intended by Linnæus; and 400,000 to 500,000, in the sense adopted by many modern botanists. The former number greatly exceeds our own estimate; this we regret that we are not prepared to lay before the reader, but hope, by means of a careful analysis, of the Floras of some large, well-explored tropical areas (much larger than have hitherto been treated of), to offer some more definite data for the foundation of such an estimate than have hitherto been published. From the numerous tables M. de Candolle has given of the known and supposed number of species inhabiting certain countries, it is evident, as we have before indicated, that his

opinion of the richness of these countries enormously exceeds that which our materials warrant us in forming; and further, it is evident that his estimate is not framed in accordance with the Linnæan sense of the term species; for instance, amongst the 1500 plants which he assigns to Britain there are, besides a great number of non-indigenous species, a still larger percentage of species that Linnæus would have considered as varieties.*

On the proportion of Genera to Species in different countries.—The uncertainty of the value of generic characters, or rather our opinion that most genera are arbitrarily defined groups, renders it exceedingly difficult to arrive at any definite conclusion upon this subject. Upon the whole, M. de Candolle concludes that the proportion of species to genera is smaller in islands than on continents, and we have no doubt that he is correct. We should further expect that the proportion would rise in direct proportion to the area of the island, just as it does in proceeding from small areas of continents to larger ones.

Chapter 25. On the division of the surface of the globe into Natural Regions.—This Chapter is chiefly devoted to a long and very interesting discussion of the merits, or rather demerits, of some of the botanical divisions hitherto proposed, and to reflections upon the difficulties that have hitherto rendered the attempt to arrive at a good division, or one that shall be recognized by any two or more botanists, quite impossible. Some remarks upon the objects to be obtained, and the errors to be avoided, are also good; but M. de Candolle gives no new attempt of his own.

For our own part, we believe that the materials do exist for an approximate determination of a limited number of tolerably well defined botanical regions, and which may be characterized by the predominance in number of species of certain Natural Families, by the features these form in the landscape, and by the absence of others. The materials however want tabulation, and the real reason why no attempt has hitherto been successful is because no one has taken pains to ascertain a sufficient number of facts in distribution. It is the number of errors

* Nyman's careful Catalogue of European Plants, just published, contains 9700 flowering plants, including a very large proportion that are doubtful, besides others which are certainly not species in the Linnæan sense. Allowing that there are as many undiscovered species in Europe as there are spurious species in Nyman's Catalogue (an enormous allowance), it would follow, according to M. de Candolle's estimate, that the globe contains twenty-five times as many plants as there are in Europe —an extravagant assumption in the present state of our knowledge.

of omission, rather than the want of skill, that have frustrated endeavours. Many of these errors have been unavoidable, it is true; but, on the other hand, the foundations of the division must be sought in a far more laborious accumulation of facts than any one has hitherto ventured upon. The fact that there are very few areas of the globe at all rich in species, of the extent of ten square degrees, that have not yielded upwards of 2–3000 species of plants now deposited in European herbaria, warrants our belief that the materials do exist. The only countries of that or greater extent not yet explored at all, and from which collections can be brought which would alter any conclusions capable of being drawn from materials now in Europe, are West Brazil, New Guinea, West China, and Central Africa; and these countries are all of them surrounded by territories from which several thousand species have been collected, which renders it extremely improbable that their vegetation presents many novel features of more than generic interest.

Chapter 26. Sketch of the vegetation of different countries in regard to the probable Origin of their Species, Genera, and Families.

The first subject investigated in this chapter is the origin of the existing European plants. Under this head, the merits of Edward Forbes's Essay on the connection of the existing Fauna and Flora of the British Isles, with the Geological changes which have affected their area, especially during the northern drift, etc. (Mem. Geolog. Surv. vol. i.), is fully discussed and highly appreciated. Forbes's argument is indeed made the basis of a complete review of this hypothesis, which is illustrated by the observations of others, and of M. De Candolle himself, who accepts nearly all its conclusions, and applies its principles to other Floras. This is followed by arguments in favour of the same views, derived from other sources, and especially from the distribution of species, which M. de Candolle thinks may possibly have been created on the Continent since Great Britain was separated from the Continent, and Ireland from Great Britain. He assumes this to be the case with the *Compositæ* and some allied families, because he finds that the species of these sensibly diminish in Great Britain, and still more in Ireland.*

* We suspect that this diminution may be so easily accounted for by climatic causes that it affords no proof of Forbes's hypothesis, even did it not require the otherwise gratuitous assumption of the relative late creation of the Order in question. M. de Candolle indeed appreciates this objection, and endeavours to explain it away, but his reasoning is not satisfactory.

From the plants of Europe M. de Candolle passes to the consideration of those of other countries, endeavouring to fix the shadows which indicate their having had an early history. The absence of peculiar species in the Plains of India he rightly assigns to their recent elevation. The vegetation of the Himalaya, he says, is less varied than that of the Alps or Pyrenees, a statement we exceedingly doubt, as also that Madagascar has more species in common with India and Ceylon than with South-eastern Africa.*

In treating of the probable Origin of some of the Genera and Natural Orders of existing plants, M. de Candolle speculates upon the significance of such facts, as that the remains of species of *Juglans*, *Acer*, and *Magnolia*, found in the European Miocene beds, remind us of the United States Flora, and that the numerous *Proteaceæ*, *Laurineæ*, *Leguminosæ*, and Palms of the European Eocene age, recall the vegetation of Australia and the Sunda Islands.† In connection with these and other facts in distribution, demanding a calm survey of such intangible hypotheses as the relative antiquity of different Orders of plants, and of plants and islands, and even of oceans and continents, there is a great deal of excellent matter, interspersed with ingenious observations, for which we must refer to the work itself.

BOOK IV. General Conclusions.

This book (consisting of only two pages), as containing a summary of M. de Candolle's conclusions, we shall translate entire:—

"The plants now inhabiting the globe have survived many changes, geological, geographical, and, latterly, historical. The history of their distribution is hence intimately connected with that of the whole vegetable kingdom.

"To explain existing facts, it is fortunately unnecessary to adopt any conclusion upon the most obscure hypotheses of Cosmogony and

* M. de Candolle says, "qu'avec les parties orientales de la Colonie du Cap;" but we suppose he includes Natal in this definition, and the coasts of Africa opposite to Madagascar.

† It must be noticed here that the assumed evidence of a relation between the European Miocene and Antipodean vegetation is not satisfactory. In the first place, many systematic botanists hesitate to accept the evidence put forward as to the Proteaceous affinity of the fossils; and with regard to the *Lauraceæ*, of which supposed leaves only have been found, they abound in extratropical regions of the northern hemisphere, and many species are found even in Japan, whilst the *Leguminosæ* and Palms are not typical of any particular tropical Flora, and are frequent in several temperate ones.

Palæontology, or on the mode of creation of species, the number originally created, and their primitive distribution. Botanical Geography can indicate certain probabilities, certain theories, but the principal facts in distribution depend upon more recent and less obscure causes. It suffices to understand and to allow certain facts and theories, which appear probable, namely, that groups of organized beings, under different hereditary forms (Classes, Orders, Genera, Species, and Races), have appeared at different places and at different times, the more simple perhaps first, the more complicated afterwards; that each of these groups has had a primitive centre of creation of greater or less extent; that they have, during the period of their existence, been able to become more rare or common, to spread more or less widely, according to the nature of the plants composing them, the means of propagation and diffusion they are possessed of, the absence or presence of animals noxious to them, the form and extent of the area they inhabit, the nature of the successive climates of each country, and the means of transport that the relative positions of land and sea may afford; that many of these groups have become extinct, whilst others have increased, at least as far as can be judged from comparing existing epochs with preceding ones; and lastly, that the latest geological epoch, the Quaternary (that which preceded the existence of man in Europe, and which followed the latest elevation of the Alps), has lasted many thousand years, during which important geographical and physical changes have affected Europe and some neighbouring countries, whilst other regions of the globe have suffered no change, or have been exposed to a different series of changes.

"Thus the principal facts of Geology and Palæontology, reduced to the most general and incontestable, suffice to explain the facts of Botanical Geography, or at least to indicate the nature of the explanation, which it requires the progress of many sciences to complete.

"The most numerous, the most important, and often the most anomalous facts in the existing distribution of plants, are explained by the operation of causes anterior to those now in operation, or by the joint operation of these and of still more ancient causes, sometimes of such as are primitive (connected with the earliest condition of the plant). The geographical and physical operations of our own epoch play but a secondary part. I have shown that in starting from an original fact, which it is impossible to understand, of the creation of a

certain form, in a certain country, and at a certain time, we ought to be able, and sometimes are able, to explain the following facts, chiefly by causes that operated previous to our own epoch:—1, the very unequal areas occupied by Natural Orders, Genera, and Species; 2, the disconnection of the areas that some of the species inhabit; 3, the distribution of the species of a genus or family in the area occupied by the genus or family; 4, the differences between the vegetations of countries that have analogous climates and that are not far apart, and the resemblance between the vegetation of countries that are apart, but between which an interchange of plants is now impossible.

"The only phenomena explicable by existing circumstances are—1, the limitation of species, and consequently of genera and families, in every country where they now appear; 2, the distribution of the species of an individual in the country it inhabits; 3, the geographical origin and extension of cultivated species; 4, the naturalization of species and opposite phenomenon of their increasing rarity; 5, the disappearance of species contemporaneous with man.

"In all this we observe proofs of the greater influence of primitive causes, and of those anterior to our epoch; but the growing activity of man is daily effacing these, and it is no small advantage of our progressing civilization that it enables us to collect a multitude of facts of which our successors will have no visible and tangible proof."

APPENDIX.

This is devoted to an enumeration of the researches necessary to advance the study of Botanical Geography, under the several heads of Physics and Meteorology, Geography, Geology, Physiology of Plants, Descriptive Botany, Botanical Travellers, Botany as applied to Forestry and Antiquarian research, and the Dead Languages.

(To be continued.)

The Transactions of the JAMAICA SOCIETY OF ARTS, from December, 1854, to December, 1855. Vol. 1. 4to. Kingston, Jamaica.

"The Jamaica Society of Arts took its origin under the government of Sir Charles Grey, and was progressing very favourably until political events occurred of such a nature as to engross all minds, and supersede, or render abortive, any effort in that direction. Circumstances

have again transpired to arouse this Society from its state of inactivity. Just as the Great Exhibition in London, 1851, under the patronage of Prince Albert, was the cause of awakening and infusing new life and vigour into some of the almost defunct Art-Societies of Britain, which had been in existence nearly a century before, so the forthcoming Paris Exhibition has been the means of calling into activity, and awakening from its slumbers, the Society of Arts in Jamaica."—"If for the Great Exhibition in London of 1851, a box of arrow-root from Montserrat, a solitary fish-pot, made by a black labourer in St. Kitts,—a specimen of seaside grapes from Barbadoes,—a box of Indian meal or maize from British Guiana,—a few physic-nuts from Demerara,—Cashew and Prickly Pear from the Bahamas,—starch and Cocoa-nut oil from Trinidad,—ornamental woods, numbering 225 specimens, from Cuba,—and a small piece of fossil-wood, sent by Governor Higginson, from Antigua, —if these were gladly admitted to the Great Exhibition, and much curiosity excited concerning them, why should not Jamaica, which abounds in every one of these, and thousands more equally valuable and equally objects of curiosity and interest,—why should not Jamaica do justice to herself, and take the high place assigned her by Providence in the productive industry of the world?" Such were the honourable motives which induced Jamaica to rouse herself from a lethargy into which she was thrown by circumstances, which brought her to the brink of ruin; and, led on by their excellent Governor, Sir Henry Barkly, a committee of some of the most able and patriotic gentlemen of the island were formed, a collection of the useful products of the island was sent to the Great Paris Exhibition in 1856, such as was second to few in that wonderful "Exposition des Produits de l'Industrie de toutes les Nations," and the Transactions of the Jamaica Society of Arts, now under consideration, were commenced, and has continued a regular monthly publication ever since.

The Editor of this Journal has been called upon to draw up a Report for Government upon the *Collection* above alluded to, as far as regarded vegetable, and especially native, products; and it is a no less agreeable task to notice some of the contents of the volume before us, abounding as it does in subjects connected with economic botany, some extracted from other works, but the majority of them original treatises, frequently indeed anonymous. Generally each number has two or more pages devoted to introductory matter, showing the importance, in a

commercial point of view, and as of the highest interest to the colony, that the inhabitants should, to the utmost, develope the resources of the island, and how they can best be turned to a useful and profitable account.

The first article contains some remarks upon "*Cassia Senna of Jamaica*," which seems to be identical with the well-known *Cassia obovata* of Aleppo. If introduced, as is probable, into the Island, it has nevertheless taken possession of the burning beach of Fort Augusta and the arid sands of the Port Royal Pallisadoes, and might assuredly be collected for medicinal purposes.

Application of (Sugar-) Cane Trash to the manufacture of Paper, with the process to be employed.—(Another of the Grasstribe, viz. the Bamboo, is most extensively employed for making paper, both coarse and fine, in China, and the process will be found given in the number of the 'Athenæum' for April 5, 1856.)

Notes on Manilla Hemp: chiefly extracts; and we trust, ere long, that valuable species of Banana, *Musa texilis*, may be introduced into our own tropical colonies.

On Mangrove Roots for Tanning; by Mr. C. Grant.

On certain Vegetable Oils; by the same gentleman.

On the Texas Millet (Sorghum cernuum?); by Mr. W. T. March.

Mr. Wilson's Fibres.—Here are valuable remarks on the useful fibres of Jamaica, by Mr. Wilson, of the Botanic Garden, Bath, St. Thomas-in-the-East, and a list of fifty-one plants yielding them, accompanied by their correct nomenclature, the *botanical* as well as the English or vernacular name, a matter of the highest consequence, more so than people are aware of. A correct *botanical* name can never mislead: but we know that under one vernacular name, *Aloe* for example, half-a-dozen different plants are intended; the one to which that name is more commonly given is no Aloe at all, and is here properly called *Agave Americana* (American Aloe or Curatoe). This is however a duty that can only be performed by a botanist, and in this particular instance (for the samples were exhibited at Paris) Mr. Wilson's services were appreciated and rewarded by a Medal.

A superior Artist's Oil; E. C. (the Hon. Edward Chitty, we believe, a valuable contributor), derived from the *Aleurites triloba*.

On Casuarina muricata (?), E. C.—The Club-wood of the South Sea Islands, cultivated in Jamaica, and recommended to be much more so

on account of the extreme hardness of the timber, and (what is not usual with hard woods) the very rapid growth of the tree. In a garden at Kingston, Jamaica, which was formerly Mr. Chitty's, a *Casuarina* was planted in July, 1848, and in 1854 had attained a height of scarcely less than fifty feet!

On the Oil of "Behn," from Moringa pterygosperma, E. C.; showing that this plant may be very profitably cultivated. The tree is a native of the East, where it is called Horseradish-tree. It is the best watch-maker's oil.

The several valuable *Memoirs on Plantain* fibre, and various ones on the different starches and meals; for example, of *Yams, Plantain, Sweet* and *Bitter Cassava*, etc. etc.

The Trumpet-tree (Cecropia peltata), recommended for textile manufacture, paper, pulp, and cordage; and no wonder, seeing it is one of the *Urticeæ*, which are celebrated for the amount and quality of fibre.

The fourth number is wholly devoted to an excellently-arranged Catalogue of the Collection of Articles first exhibited in Kingston Museum, Jamaica, and afterwards sent to the Paris Universal Exhibition. The introductory remarks in this portion of the work give an excellent epitome of the natural history of the Island. And No. 6 and some following ones, to the able Report from the Museum Committees, and various Minutes of Proceedings respecting the formation of a permanent Museum in Jamaica.

On Tamarinds; the uses and advantages of cultivating the tree.

On Panama Hats, E. C.—The plant affording the material of which these celebrated hats are made (*Carludovica palmata*, according to Mr. Purdie) has been successfully introduced by Mr. Wilson.

On the Cashew and its uses; Bread from Yam Flour; Amadou, or Tinder, from the male catkins of the Bread-fruit, Artocarpus incisa.—This latter curious substance was exhibited at Paris.

On the Black Pepper (Piper nigrum).—Mode of preparing the Pepper from another and native species, *Piper Amalago*, is also given.

On the Exchange of Exotic Plants; recommended for mutual advantage.

On the Divi-Divi (Cæsalpinia coriaria); a valuable tanning substance.

On the Commercial Quassia or Bitter-wood: an interesting memoir, clearing up the differences between *Quassia amara*, or Surinam Bitter-

wood; *Simaruba officinalis*, the Simarouba, or officinal Bitter-wood; and the *Simaruba excelsa*, or lofty Bitter-wood.

On the Podocarpus or Yacca (Podocarpus Purdiei).—A tree of this has been detected in the neighbourhood of Dunrobin Castle (elevation 3000 feet above the sea), 100 feet in height, and 42 inches in diameter at 6 feet from the ground. The wood has been proved to be of indifferent quality by Captain Fowke.

A Paper on *the "Causes of the Evils which tend to the prostration of Jamaica,"* will be read by all with interest, and by many, it is to be hoped, with profit.

On Bitter Cassava; its more extended cultivation strongly urged.

On Corn-husk Bonnets.—Bonnets made of the corn-husks or corn-trash (the sheathing covering of the great ears) were exhibited at the Paris Exhibition, and are said to be as durable as straw.

On the Aloe of Commerce, a true Aloe (*Aloe Barbadensis,* introduced to Barbadoes from the Cape).

On Tartaric Acid from Tamarinds.

On Holcus saccharatus, lately so strongly recommended for sugar by a gentleman of Natal, in preference to the sugar-cane; but we are here correctly informed that the "sugar-cane need not fear her northern rival."

Hoops and Ox-bows made from the Rose Apple-tree (Eugenia Jambos, *Linn.*).

Fibre of the Jerusalem Dagger-plant (Yucca aloifolia).—This seemed to promise well, but the quantity sent (as was unfortunately the case with the fibres generally that were sent by Jamaica to the Paris Exhibition) was too small for satisfactory experiment.

Paper from Plantain Fibre and from Wood.

The last notice of the year, relating to vegetable products, is not the least interesting, the application of the *Castor-oil plant* (Ricinus communis), for feeding a new kind of silkworm* from Assam. The subject, in another collection, attracted much interest among the naturalists of Paris; and a silver medal was awarded to the exhibitor on that occasion.

With great pleasure we have received the commencement of the second volume, and shall be glad to notice it at some future period.

* Caterpillar of the *Bombyx Cynthia.*

SCHOTT, HENRY; *Synopsis* AROIDEARUM, *complectens Enumerationem Systematicam Generum et Specierum hujus Ordinis.* Vol. I. 8vo. Vindobonæ, 1856; 153 pages.

The name of Schott has long been familiar to the student of Aroideous plants, and the collection of living *Aroideæ* at Vienna, under his charge, has a wide reputation. In our Journal for 1855, p. 224, July number, we noticed, with great commendation, the two Fascicles in folio of the great work on *Aroideæ*, alike admirable in matter and illustration. We do not learn that any more of that work has been yet issued, and probably the slowness of the progress of it, owing to the careful execution of the plates, has induced the author to lay before the botanical world a synopsis or a systematic enumeration of all known genera and species of the Family, giving characters or remarks on the genera, and observations on, or characters of, the species.

In this useful little work the *Aroideæ* are divided into two great groups—1, DICLINES, and 2, MONOCLINES; the first Part now before us embraces all of the first group, and include—1, *Cryptocoryne;* 2, *Lagenandra;* 3, *Ambrosinia;* 4, *Arisarum;* 5, *Pinellia;* 6, *Biarum;* 7, *Ischarum;* 8, *Gymnomesium;* 9, *Arum;* 10, *Eminium;* 11, *Typhonium;* 12, *Theriophonum;* 13, *Helicodiceros;* 14, *Helicophyllum;* 15, *Dracunculus;* 16, *Dochafa;* 17, *Sauromatum;* 18, *Arisæma;* 19, *Zomicarpa;* 20, *Plesmonium;* 21, *Conophallus;* 22, *Brachyspatha;* 23, *Pythonium;* 24, *Amorphophallus;* 25, *Ariopsis;* 26, *Colocasia;* 27, *Remusatia;* 28, *Gonatanthus;* 29, *Alocasia;* 30, *Peltandra;* 31, *Caladium;* 32, *Xanthosoma;* 33, *Acontias;* 34, *Syngonium;* 35, *Anchomanes;* 36, *Zamioculcas;* 37, *Montrichardia;* 38, *Philodendron;* 39, *Culcacia;* 40, *Zantedeschia;* 41, *Homalomena;* 42, *Cyrtocladon;* 43, *Schismatoglottis;* 44, *Aglaonema;* 45, *Spathicarpa;* 46, *Asterostigma;* 47, *Dieffenbachia;* 48, *Richardia;* 49, *Stylochiton.*

We shall welcome the appearance of the second, and, we presume, concluding part of this Synopsis; and no less so the continuation of the illustrated "AROIDEÆ" of this author.

On the Bamboo *and* Durian *of* Borneo; *by* A. R. Wallace, Esq., F.L.S. (*In a Letter to* Sir W. J. Hooker.)

Two vegetable productions particularly attracted my attention in Borneo,—the Bamboo, most useful of plants, and the Durian, king of fruits.

Different species of Bamboo abound in all tropical countries, and wherever they are found the natives apply them to a great variety of uses. Their strength, lightness, smoothness, straightness, roundness, and hollowness,—the facility and regularity with which they can be split,—their different sizes, the varied distance of their joints, the ease with which they can be cut, and with which holes can be made in them, —their hardness outside, their freedom from any taste or smell, their great abundance, and the facility with which they are propagated,—all make them fitted for a hundred different purposes, to serve which other materials would require much labour and preparation. They are at once the most wonderful and the most beautiful production of the tropics, and the best gift of Nature to uncivilized man.

I shall briefly mention the uses to which they are applied by the native tribes of Borneo, which have fallen under my notice, and which have struck me the more forcibly, because in the parts of South America I have visited, Bamboos are comparatively scarce, and where found, but little used, their place being taken, as to one class of uses, by the great variety of Palms, and as to another, by Calabashes and Gourds.

The Dyak houses are all raised on posts, and are often two or three hundred feet long, and forty or fifty wide. The floor is always formed of large bamboos, which are split into four or five strips, so that each may be nearly flat, and these are firmly tied down with rattan to the rafters beneath. This, when well made, is a delightful floor to walk upon barefooted, the rounded surfaces of the bamboo being very smooth and agreeable to the feet, while at the same time affording a firm hold. But what is more important, they form, with a mat over them, an excellent bed,—the elasticity of the bamboo, and the undulating nature of the surface, being far superior to a more rigid or flatter floor. Here at once we have a use which cannot be supplied so well by another material without a vast amount of labour, all Palm stems and other substitutes requiring much cutting and smoothing, and not being equal

to bamboo when finished. Some tribes however prefer a flat and close floor, and they make bamboo-boards for the purpose, by splitting open a large bamboo on one side only, and flattening it out, so as to form beautiful slabs, eighteen inches wide and six feet long, with which they floor their houses. These, with constant rubbing and daily smoke, become dark and polished, so that their material can at first sight be hardly recognized. What labour is here saved, to a savage with only his axe, who, if he wanted boards, must hew them out of the solid tree, and, with all his labour, could never produce a surface so smooth and beautiful as the bamboo, thus treated, affords him. Again, if a temporary house or shed is wanted, either by the traveller in the jungle or by the native in his paddy-fields, nothing is so convenient as the bamboo, with which a house can be constructed with half the labour and in half the time, than if any other material is used.

The hill Dyaks in the interior of Sarawak make paths for great distances, to their cultivated grounds, in the course of which they have to cross rivers and numerous gullies and ravines, or sometimes to avoid a long circuit, to carry the path along the face of a precipice. In all these cases the bridges they construct are of bamboo, and so admirably adapted is the material to the purpose, that it seems doubtful whether they would ever have made them had they not possessed it. The Dyak bridge is simple but well designed. It consists merely of bamboo poles, crossing each other at the roadway like the letter X, and rising, sometimes on one side, sometimes on both, three or four feet above it. At the crossing they are firmly bound together, and to a horizontal bamboo, which forms the only footpath, with another higher up, serving as a hand-rail. When a river is to be crossed, an overhanging tree is chosen, from which the bridge is partly suspended, and partly supported by diagonal struts from the banks, so as to avoid placing posts in the stream itself, when liable to floods. In carrying a path along the face of a precipice, trees and roots are made use of for suspension, from every little notch and crevice struts arise, while immense bamboos, of fifty or sixty feet long, are fixed on some bank or tree below. These bridges are traversed daily by men and women carrying heavy loads, so that any insecurity is soon discovered, and, as the materials are close at hand, immediately repaired. When the path goes over very steep and slippery ground, the bamboo is used to form steps. Pieces are cut, about a yard long, and opposite notches

being made at each end, holes are formed, through which pegs are driven, and a ladder or staircase is produced with the greatest celerity. It is true that much of this will decay in one or two seasons, but it is so quickly replaced, as to make it more economical than using a more durable wood.

One of the most striking uses to which Bamboo is applied by the Dyaks, is in climbing the loftiest forest-trees, either to gather fruit or to obtain wax. The honey-bee of Borneo very generally makes its nest on the branches of the "Tappang," a tree which towers above all others in the forest, and whose smooth cylindrical trunk rises a hundred feet or more without a branch. Bees'-wax is one of the most valuable products of the forest, and the Dyaks climb these lofty trees at night to obtain it, by means of bamboo pegs driven into the wood. These pegs are formed of thick, old bamboo, split to about two inches wide. Each is cut above a joint, which forms a solid head to bear the blows of the mallet, and the point is flat and broad, cut away carefully to the siliceous outer coating. To the head of each is strongly tied a strip of the tough rind of a water-plant. The climber carries forty or fifty of these pegs in a basket by his side, and has a wooden mallet suspended round his neck; he has also prepared a number of strong, but slender bamboos, each from twenty to thirty feet long. One of these he sticks firmly in the ground at the foot of the tree, and close to it; he then drives in a peg as high as he can reach, and ties it firmly by the head to the bamboo; climbing up upon this, he drives in and ties two other pegs, each about three feet from the one below it, passing his arm between the tree and the bamboo, to hold the peg which he is driving in. He soon reaches the top of his pole, when another one is handed up to him, and being bound to the one below, he ascends in the same way another twenty feet. When his pegs are exhausted, a boy brings a fresh basketful up to him, and a long cord enables him to pull up the bamboos as he requires them. This mode of ascent looks perilous, but is in reality perfectly secure. Each peg holds as tightly as a spike-nail, besides which the weight is always distributed over a great number of them by means of the vertical bamboos. Trees which branch at forty feet or less, are often ascended by pegs alone, which, besides being dangerous, requires much skill and activity in the climber, as he must grasp the middle peg firmly with his hand to hold himself up, and has but one hand at liberty to drive in the pegs. I have seen trees as-

cended by both methods, and admired the excellent qualities of bamboo, as well as the ingenuity of the Dyaks in taking advantage of them.

Split and shaved thin, bamboo is the strongest material for baskets; conical fish-traps, hencoops, and birdcages are made by splitting a piece up to the joint which forms the top, gradually-increasing circles of rattan being inserted below; rough fruit-baskets are also rapidly made in this manner. Aqueducts are formed by large bamboos split in half, supported on crossed poles of various heights. They are the Dyaks' only water-vessels, and are in fact superior to earthen vessels, being clean, light, and easily carried. A dozen water-bamboos stand in the corner of every Dyak house. They also make excellent cooking utensils; vegetables and rice are often boiled in them. They are used to preserve sugar, vinegar, honey, salted fruit or fish,—in fact, they answer every purpose for which jars and bottles are used by us. In a small bamboo case, prettily carved and ornamented, the Dyak carries his *sirih* and lime for betel-chewing, and his little long-bladed knife has a bamboo sheath. His favourite pipe is a huge hubble-bubble, which he will construct in a few minutes by inserting a small piece of bamboo for a bowl, at an acute angle, into a large cylinder, about six inches from the bottom, which contains water through which the smoke passes. In many other small matters the bamboo is of daily use, but enough has been here mentioned to show its value, as a substitute in many cases for iron, and in enabling the natives to dispense with a variety of tools and utensils.

The second object of my especial admiration is the Durian, a fruit of which we hear little in England, where all praise is given to the Mangosteen, while the Durian is generally mentioned as a fruit much liked by natives, but whose offensive smell renders it disagreeable to Europeans. There is however no comparison between them; the Mangosteen resembles a peach or a grape, and can hardly be said to be superior, if equal, to either: the Durian, on the other hand, is a fruit of a perfectly unique character; we have nothing with which it can be compared, and it is therefore the more difficult to judge whether it is or is not superior to all other fruits.

The Durian grows on a large and lofty forest-tree, something resembling an Elm in character, but with a more smooth and scaly bark. The fruit is round or slightly oval, about the size of a small melon, of a green colour, and covered with strong spines, the bases of which

touch each other, and are consequently somewhat hexagonal, while the points are very strong and sharp. It is so completely armed that if the stalk is broken off it is a difficult matter to lift one from the ground. The outer rind is so thick and tough that from whatever height it may fall it is never broken. From the base to the apex five very faint lines may be traced, over which the spines somewhat curve and approximate; these are the sutures of the carpels, and show where the fruit may be opened with a heavy knife and a strong hand. The five cells are silky-white within, and are filled with a mass of firm, cream-coloured pulp, containing about three seeds each. This pulp is the eatable part, and its consistence and flavour are indescribable. A rich custard highly flavoured with almonds gives the best general idea of it, but there are occasional wafts of flavour that call to mind cream-cheese, onion-sauce, sherry-wine, and other incongruous dishes. Then there is a rich glutinous smoothness in the pulp which nothing else possesses, but which adds to its delicacy. It is neither acid nor sweet nor juicy; yet it wants neither of these qualities, for it is in itself perfect. It produces no nausea or other bad effect, and the more you eat of it the less you feel inclined to stop. In fact, to eat Durians is a new sensation worth a voyage to the East to experience.

The smell of the ripe fruit is certainly at first disagreeable, though less so when it has newly fallen from the tree; for the moment it is ripe it falls of itself, and the only way to eat Durians in perfection is to get them as they fall. It would perhaps not be correct to say that the Durian is the best of all fruits, because it cannot supply the place of subacid juicy fruits such as the orange, grape, mango, and mangosteen, whose refreshing and cooling qualities are so grateful; but as producing a food of the most exquisite flavour it is unsurpassed. If I had to fix on two only as representing the perfection of the two classes, I should certainly choose the Durian and the Orange as the king and queen of fruits.

The Durian is however (in another way) dangerous. As a tree ripens the fruit falls daily and almost hourly, and accidents not unfrequently happen to persons walking or working under them. When a Durian strikes a man in its fall it produces a fearful wound, the strong spines tearing open the flesh, while the blow itself is very heavy; but from this very circumstance death rarely ensues, the copious effusion of blood preventing the inflammation which might otherwise take place.

A Dyak chief informed me that he had been struck down by a Durian falling on his head, which he thought would certainly have caused his death, yet he recovered in a very short time.

Poets and moralists, judging from our English trees and fruits, have thought that there existed an inverse proportion between the size of the one and the other, so that their fall should be harmless to man. Two of the most formidable fruits known, however, the Brazil Nut (*Bertholletia*) and the Durian, grow on lofty trees, from which they both fall as soon as they are ripe, and often wound or kill those who seek to obtain them. From this we may learn two things:—first, not to draw conclusions from a very partial view of Nature; and secondly, that trees and fruits and all the varied productions of the animal and vegetable kingdoms, have not been created solely for the use and convenience of man.

The unripe Durian makes a very good vegetable, and it is also eaten raw. In a good fruit season the Dyaks preserve quantities of the pulp salted in jars and bamboos, in which state it will keep the year round, and is much esteemed as a relish with their rice. They seem hardly to appreciate the ripe fruit in its perfection, from the quantities they gather unripe, and from the small value they place upon it, as compared with the Jack and some other fruits. In Borneo great numbers of Durian trees have been planted on the mountains occupied by the Dyaks, and on the rivers' banks in the interior. In the jungle are found two varieties with much smaller fruits, one of them of an orange-colour inside; and these are probably the originals of the large and fine Durians which seem never to be produced in a wild state. In the tropics as well as in our colder climates, fruits always seem to be improved by cultivation.

On some Undescribed Species of Musci *belonging to the Genera* Mnium *and* Bryum; *by* W. Mitten, Esq.

(Plate XI. *A*, *B*.)

1. Mnium *insigne*, Mitten; dioicum, caulibus sterilibus procumbentibus, fertilibus erectis subsimplicibus elatis, foliis oblongis nervo excurrente cuspidatis marginatis serratis basi parum angustatis longe lateque decurrentibus, perichætialibus exterioribus longioribus interioribus brevibus subulatis angustis, theca longe pedunculata ovali pendula, operculo conico obtuso, peristomio normali.

Hab. Sweden, *Sommerfelt.* Britain: Sussex, *Mitten;* Cheshire, *Wilson.* "The Vosges," *Mougeot and Schimper.* North America, *Menzies, Douglas, Drummond, Burke.*

This fine species differs from *M. affine*, Bland., in its longer and narrower leaves, which are widely decurrent at their bases; in *M. affine* the leaves are narrowed to a base not wider than the stem, and not at all decurrent. In its general appearance this Moss is intermediate between *M. affine* and *M. undulatum;* to the last it approaches very nearly when dry. The stems most frequently bear several capsules, which resemble those of *M. affine.*

The Fig. 2 of Tab. X. of *M. affine, β elatum*, 'Bryologia Europæa,' *Mnium*, is evidently taken from a portion of the stem of *M. insigne.*

2. Mnium *venustum*, sp. nov.; synoicum, caulibus fertilibus sterilibusque erectis rigidis densifoliosis, foliis erecto-patentibus ellipticis acuminatis nervo excurrente cuspidatis marginatis argute dentatis, perichætialibus cuspidatis interioribus angustis lanceolatis, theca in pedunculo longiusculo inclinata pendulave oblonga, basi poris pluribus cellulis intensius coloratis circumductis quasi apophysata, operculo conico acuminato acuto. (Tab. XI. *A.*)

Hab. West coast of North America, *Menzies* and *Douglas.*

In size, colour, and general appearance, very nearly resembling *Mnium cuspidatum*, but the leaves are more acuminate and more rigid, the capsule longer, with a band of coloured stomata at its base, resembling an apophysis. The sterile stems appear to have the habit of those of *M. hornum.*—Plate XI. *A.* fig. 1, plant, *nat. size;* 2, perichætial leaves; 3, cauline ditto; 4, capsule; 5, areolation of leaf; 6, ditto of *M. affine*, to show their relative size:—*all highly magnified.*

3. Mnium *trichomanes*, sp. nov.; dioicum, caulibus sterilibus procumbentibus, fertilibus erectis, foliis ellipticis ovatisve marginatis e medio ad apicem serratis nervo excurrente mucronatis basi decurrentibus, perichætialibus longioribus lanceolatis, theca ovali pendula, operculo convexo conico. (Tab. XI. *B.*)

Hab. Moist, shaded bank in a glen, Pih-quan Island, China, *Alexander;* North-west India, without fruit, *Dr. Thomson.*

Size, habit, and colour of *M. cuspidatum*, but distinct in the inflorescence; remote from *M. affine*, including the var. *Rugicum*, in the decurrent leaves, and dense substance of its leaves composed of cells three times smaller. The capsules are too immature to afford any idea

of the peristome.—Plate XI. *B.* fig. 1, plant, *nat. size;* 2, perichætial leaves; 3, cauline ditto; 4, capsule:—*all magnified.*

4. Bryum *rubens*, sp. nov.; dioicum, caule breviusculo, foliis ellipticis ovatisve nervo excurrente mucronatis tenui-marginatis apicem versus serratis e cellulis satis magnis elongatis limitibus angustis firmis areolatis, perichætialibus angustioribus, theca clavato-oblonga, operculo magno brevi conico acuto, peristomio normali.

HAB. Throughout the temperate parts of Europe, Asia, and North-west America.

Very variable in size, but easily distinguished from *B. sanguineum*, Brid. (*B. erythrocarpum*, Schw.), by its leaves being twice as wide as the margin, distinctly not recurved, the serratures larger, the areolation composed of cells of about the same length, but double the width. The capsules are not quite so slender, but in other respects nearly resemble those of *B. sanguineum.* When old, the whole plant becomes of a deep red colour.

This species has been confused with its near ally *B. sanguineum*, and with some others. The following is a summary of the specimens examined:—

B. erythrocarpum, β *sylvaticum*, Hampe, Exsic. No. 201.—In sylvis Blankenburgicis.

B. erythrocarpum, Istria, *Mueller.*

B. longisetum, from near Hamburg.

B. turbinatum, Dickson, in Herb. Hooker.

B. Morisii, Bruch, MSS. Sardinia, *Mueller.*

It is possible that *B. rubens* is *B. radiculosum*, Brid., but in the 'Bryologia Europæa,' where a good figure of *B. sanguineum*=*B. erythrocarpum* is given, *B. radiculosum* is enumerated as a slight variety, and not figured. Bridel, too, compares his Moss to *B. carneum*, from which it may be assumed that it must be something different; the geniculate seta can scarcely be supposed to be a character worth notice.

B. sanguineum, Brid., is in habit and appearance a miniature resemblance to *B. alpinum*, but *B. rubens* in the same respects approaches more to *B. cæspiticium*, without however being so nearly allied to it as to *B. sanguineum.*

B. Morisii, Bruch, MSS., is in De Notaris' 'Syllabus' enumerated as *B. tomentosum*, Brid., but now considered by the author to be a

state of *B. torquescens*. With regard to this MS. name of Bruch's, 'Bryologia Europæa' is silent.

5. Bryum *Gardneri*, sp. nov.; synoicum, caule humili, foliis patentibus lanceolatis planiusculis nervo excurrente mucronatis margine reflexis apice serrulatis, perichætialibus conformibus, theca ovali-pyriformi, operculo magno conico apicululato, peristomio *B. sanguinei*.

HAB. Organ Mountains, Brazil, on a clay bank, *Gardner*, No. 37.

Closely resembling *B. sanguineum* in size and general appearance, but in proportion its leaves are longer and the margin reflexed.

DECADES OF FUNGI; *by the* REV. M. J. BERKELEY, M.A., F.L.S.

Decades LIX.–LX.

(With Plates V., VI., IX., X.)

Rio Negro Fungi.

(*Continued from p.* 200.)

581. *P.* (Inodermei) *chrysites*, n. s.; pileo tenui coriaceo flexili tomento denso rhabarbarino vestito sulcato-zonato; hymenio concolori; poris minutis angulatis; dissepimentis tenuibus.

HAB. On dead trunks in woods. San Carlos. August, 1853.

Pileus $2\frac{1}{2}$ inches across, dimidiate, convex, thin, flexible, coriaceous, clothed with dense rhubarb-yellow, spongy down, zonato-sulcate. Hymenium concave, of the same colour as the pileus; pores minute, $\frac{1}{200}$ of an inch across, angular; dissepiments thin; substance yellow, like the pileus.

A beautiful species, resembling in colour *P. Splitgerberi*, Mont. The whole substance of the pileus resembles the external coat, with the exception of a very thin, hard, dark plate or two, a little beyond the hymenium.

582. *P.* (Inodermei) *cupreo-roseus;* pileo tenui subconvexo coriaceo cupreo sericeo-nitente radiato-rugoso lineatoque crebrizonato; margine acuto; hymenio vinoso; poris mediis flexuosis. Spruce, n. 184.

HAB. On dead trunks. Panuré, February, 1853. San Carlos, August, 1853.

Pileus 9 inches or more across, $4\frac{1}{2}$ long, thin, somewhat convex,

coriaceous, at first velvety behind, radiato-rugose and marked with raised lines, repeatedly zoned, pink, tinged with fawn, and at length copper-coloured, shining with a silky lustre, especially with age; margin acute, lobed or nearly entire; substance pink. Hymenium flat or convex, rose-coloured, at length vinous; pores middle-sized, $\frac{1}{50}$ of an inch across, flexuous.

A most splendid species, varying in shade with age, but always displaying beautiful red tints; in one variety obscured both above and below with umber. The colour of the hymenium in the younger specimens is just that of raspberries and cream.

* *P. Floridanus*, B., Ann. of Nat. Hist. vol. x. p. 376.

Hab. On trunks of trees in woods. San Carlos.

There are two forms,—one thinner, broader, more flexible, and with paler, more concentrically arranged pores.

583. *P.* (Inodermei) *albo-cervinus*, n. s.; pileo tenui coriaceo flabelliformi reniformique cervino subtiliter tomentoso zonato rugosiusculo; hymenio albo; poris minutis punctiformibus. Spruce, n. 22.

Hab. On dead trunks. Panuré, and at the foot of Mount Cocui.

Pileus 2 inches across, thin, coriaceous, very variable in form, sometimes spuriously stipitate and cuneiform, sometimes flabelliform, sometimes reniform or effused and reflexed, fawn-coloured, zoned, even or radiato-rugose. Hymenium white or slightly tinged with umber; pores minute, $\frac{1}{150}$ of an inch across, punctiform.

This pretty but very variable species has many points in common with *P. Didrichsenii*, but differs evidently in the far smaller pores.

* *P.* (Inodermei) *hirsutus*, Fr. Ep. p. 477. Spruce, n. 28, 60.

Hab. On decaying trunks. Panuré.

* *P.* (Inodermei) *velutinus*, Fr. Ep. p. 478.

Hab. On dead branches in woods. San Carlos. August, 1853.

A very thin, pale, tomentose variety, resembling in colour and habit *P. hirsutus*.

584. *P.* (Inodermei) *hædinus*, n. s.; albus, suborbicularis, postice decurrens, tenuis, papyraceus; pileo subtiliter pubescente sulcato-zonato; hymenio concolori; poris angulatis minutis; dissepimentis tenuibus. Spruce, n. 38, 203.

Hab. On decaying trunks. Panuré.

Pileus 1–2½ inches across, suborbicular, decurrent behind, very thin and flexible, clothed with depressed matted down, sulcato-zonate; edge

nearly entire. Hymenium of the same colour as the pileus; pores minute, $\frac{1}{100}$ of an inch across, angular; dissepiments very thin.

An elegant species, allied to *P. hirsutus,* but much thinner, with finer pores, and destitute of distinct hairs.

585. *P.* (Resupinatus) *deglubens*, n. s.; albus, resupinatus; margine ubique liberato inflexo elevato-zonato nitido; poris minutis punctiformibus.

Hab. On dead sticks. San Carlos.

White. Patches elliptic, $\frac{3}{4}$ of an inch long; margin free all round, inflexed, shining with a silky lustre, marked with one or two acute zones or ridges; pores scarcely visible to the naked eye, punctiform.

586. *P.* (Resupinatus) *cavernulosus*, n. s.; totus resupinatus, rigidiusculus, sordide cervinus; margine brevi tomentoso; poris mediis angulatis, acie rigidis. Spruce, n. 204.

Hab. On dead branches. Panuré.

Resupinate, orbicular, at length confluent, of a dirty fawn colour, darker in the centre, rigid; margin narrow, formed of matted down, but not byssoid; pores $\frac{1}{45}$ of an inch across, subhexagonal; edge rigid, sometimes elongated at the commissures, sometimes slightly waved.

587. *P.* (Resupinatus) *carneo-pallens*, n. s.; totus resupinatus, tenuis, carneus; margine obsoleto; poris minutis; dissepimentis tenuissimis angulatis. Spruce, n. 178.

Hab. On dead trunks. Panuré. February, 1853.

Entirely resupinate, thin, flesh-coloured, without any distinct margin, or where there is anything beyond the hymenium, consisting of a little matted down; pores $\frac{1}{150}$ of an inch across, angular; dissepiments very thin; edge nearly entire, paler, often broken up and expanded.

588. *P.* (Resupinatus) *evolvens*, n. s.; resupinatus, demum liberatus, centro affixus; pileo sursum cupreo-incarnato sericeo-nitente; hymenio gilvo; poris parvis, acie dentato-elongatis. Spruce, n. 214.

Hab. On dead wood. San Carlos del Rio Negro. May, 1853.

Orbicular, confluent, resupinate, at length free and attached in the centre, of a coppery, flesh colour above, silky, slightly zoned; edge thin, sometimes torn. Hymenium darker; pores small, $\frac{1}{70}$ of an inch across, angular; dissepiments thin; edge dentato-elongated, especially at the commissures.

* *Trametes fibrosa*. Fr. El. p. 490. Spruce, n. 201.

HAB. On dead trunks. Panuré.

* *T. Hydnoides*, Fr. El. p. 490.

HAB. In woods. San Carlos. August, 1853.

* *T. occidentalis*, Fr. El. p. 491. Spruce, n. 29, 185.

HAB. On dead wood in the neighbourhood of cottages. Very common. Rivers Uaupés and Negro. February, 1853.

589. *T. sclerodepsis*, n. s.; pileo subtenui rigido suberoso dimidiato plano albido-cinereo; margine acuto, zonis crebris cervinis picto, radiato striato rugosuloque; hymenio pallide umbrino convexiusculo; poris punctiformibus. Spruce, n. 167.

HAB. On dead trunks. Panuré.

Pileus 8 inches or more across, 6 long, dimidiate, flat, rather thin, hard and corky, dirty-white or ash-coloured, marked with numerous zones, those towards the margin broader and fawn-coloured, pruinose, but not decidedly tomentose; substance whitish. Hymenium rather convex, pale umber; pores punctiform, $\frac{1}{60}$ of an inch across.

Something in the style of *T. occidentalis*, but far larger, more woody, and free from any woolly coat.

590. *T. Sprucei*, n. s.; pileo crassiusculo gibboso obtuso dealbato; contextu duro; poris subrotundis subflexuosis; dissepimentis obtusis. Spruce, n. 166.

HAB. On trunks of trees. March, 1853. Panuré.

Pileus $1\frac{1}{2}$–2 inches across, $\frac{1}{2}$ an inch long, decurrent behind, gibbous, obtuse, even or nearly so, opaque, white, as if whitewashed; substance hard, white; pores about $\frac{1}{84}$ of an inch broad, roundish, but slightly flexuous; dissepiments rigid; edge obtuse.

The habit of this species is peculiar. There is not the slightest tendency to form gills.

591. *Dædalea Sprucei*, n. s.; pileo suberoso subconvexo scabriusculo; margine zonato; hymenio convexo; poris flexuosis; dissepimentis in lamellas ruptis. Spruce, n. 41.

HAB. On dead trunks. Panuré.

Pileus 5 inches or more across, dirty-umber, corky, thin, slightly rough, zoned towards the margin; dissepiments of the elongated, flexuose pores brown-umber, soon broken up into lamelliform processes.

At a very early stage of growth, when the pileus is only an inch across, the dissepiments are broken up, so as to present the true characters of *Dædalea*, to which genus the species must be referred.

592. *Hexagonia* (Pleuropus) *gracilis*, n. s.; pileo reniformi subpulvinato rufo pallescente glabro; stipite gracili elongato laterali; poris mediis hexagonis e rufo cinereis. Spruce, n. 7. (Tab. V. fig. 4.)

HAB. On the ground in Caatingas. Panuré.

Pileus $\frac{1}{2}$–1 inch across, reniform, somewhat pulvinate, red-brown, marked with a few, delicate, raised lines, at length pallid. Stem lateral, not confluent with the pileus, cylindrical, delicate, 4–6 inches high, 1 line thick, pale umber, pruinose. Hymenium nearly plane; pores hexagonal, $\frac{1}{20}$ of an inch across, at first reddish-umber, then cinereous.

A very elegant species, exhibiting quite a new form of the genus.

593. *H. erubescens*, n. s.; pileo rigido suberoso rugoso zonato sordide umbrino demum setoso-scabro; hymenio convexo vinoso; poris flexuosis. Spruce, n. 40.

HAB. On dead trunks. Panuré, San Carlos.

Pileus $2\frac{1}{2}$ inches across, dimidiate, slightly convex, rugged, hard and corky, dirty-umber. Hymenium convex, vinous red; pores $\frac{1}{10}$ of an inch across, flexuous.

The vinous tint of the flexuous pores distinguish this species, which connects *Dædalea* with *Hexagonia*.—The Panuré specimens are nearly smooth; that from San Carlos hispido-scabrous towards the margin, far thinner, and strongly zoned.

594. *Favolus Sprucei*, n. s.; albus, aquosus; pileo orbiculari excentrico convexo glabro; stipite deorsum incrassato; hymenio convexulo; poris hexagonis amplis. Spruce, n. 117. (Tab. V. fig. 8.)

HAB. On dead wood.

White, soft, and watery. Pileus 1–2 inches across, convex when fresh, shrinking much in drying, smooth. Stem 1 inch or more high, 2 lines thick, attenuated upwards, excentric; pores nearly 1 line broad, hexagonal, smooth within.

Allied to *F. cycloporus*, Mont., but on a larger scale. *F. manipularis*, Berk., from Ceylon, is tufted, with slender stems. *F. intestinalis* has very large pores and no stem.

* *Laschia tremellosa*, Fr. Spruce, n. 83.

HAB. On dead trunks. January, 1853. Panuré.

595. *Porothelium* (Pleuropus) *rugosum*, n. s.; pileo suberoso reniformi ovato crenato radiato-rugoso rufo-umbrino crebrizonato; margine crenato-lobato; hymenio luteolo; stipite laterali noduloso umbrino pruinoso; contextu pallido. Spruce, n. 44. (Tab. IX. fig. 2.)

Hab. On decayed trunks. Panuré.

Pileus 3 inches across, moderately thick, reniform, reddish-umber, corky, radiato-rugose, repeatedly zoned, zones often impressed; margin lobed and crenate. Stem 2–2½ inches high, $\frac{1}{5}$–$\frac{1}{2}$ of an inch thick, irregular, nodulose, cylindrical or compressed. Hymenium yellowish, inclining to orange.

The pileus is very rugged and crumpled, and contrasts curiously with the yellowish hymenium, which, in consequence, looks almost like a parasite. When the pores grow obliquely, a large portion of the wall is displayed so as to present a very curious effect.—If the hymenium of this species is carefully examined, it will be found to differ in no respect from *Porothelium.* The pores are perfectly distinct on their first appearance, and it is only by confluence and elongation that they assume a character approaching that of *Polyporus*, or rather of *Fistulina.* If resupinate *Polypori* are to be retained in the genus *Polyporus*, no good reason can be given why Mesopod and Pleuropod *Porothelia* should not be retained in that genus. *P. rugosum* is connected directly with *Polyporus* by *P. variabilis*, *P. pallidus*, and several other species of this collection.

596. *Irpex Sprucei*, n. s.; mesopus, infundibuliformis; pileo ochraceo scabro; stipite elongato irregulari; hymenio albo; setis basi membranacea connexis.

Hab. On the ground, amongst roots. Panuré.

Pileus infundibuliform, ¾ of an inch across, ochraceous, rough with raised points. Stem 1½ inch or more high, cylindrical, irregular, flexuous. Hymenium white, decurrent; teeth springing from the edge of a membranous fold.

A very singular plant, of which only a single specimen was gathered.

597. *Thelephora subclavæformis*, n. s.; brunnea; pileo e spathulato lobato-subclavæformi sursum velutino; hymenio lineatim rugoso glabro.

Hab. On the ground, with n. 84. Panuré.

Brown. Pileus 1–1½ inch high, at first clavato-spathulate, at length deeply lobed, the lobes subclavate, somewhat crenate, velvety above. Stem confluent with the pileus, compressed, with a little white down and mycelium at the base. Hymenium decurrent, marked by linear folds.

A very singular species, and perfectly distinct.

598. *T. ocreata*, n. s.; albus, ramosus; stipite fere ad basin diviso tomento candido ocreato; ramis furcatis cylindricis apicibus acutis. Spruce, n. 11.

HAB. Amongst dead leaves. Panuré.

White, 2–3 inches high, divided almost to the base. Stem cylindrical, clothed as far as the secondary division with white, densely matted down; branches erect, repeatedly forked, cylindrical, tips acute.

Resembling *T. candida*, Schwein., but without any tendency to be compressed. Much divided forms of *T. pallida*, Schwein., also approach it, but there is little doubt that it is distinct. The younger plants are entirely involved in the white clothing.

599. *T. trachodes*, n. s.; pallida, cæspitosa; stipitibus cylindricis subtenuibus sursum furcatis processibus setiformibus scabris; ramis fastigiatis repetiter furcatis acutis. Spruce, n. 153. *Clavaria cladonina*, Bory, MSS.

HAB. On the ground. Panuré, Guadaloupe.

About 1½ inch high, probably white when fresh, tufted. Stems slender, cylindrical, clothed as far as the second or third division with little sharp processes, somewhat resembling the persistent nerves on the stem of some Mosses; branches fastigiate, acute, scarcely compressed.

This has the habit of *T. candida*, etc., but is more delicate and finely divided, with apparently little tendency to become flat. The processes on the stem distinguish it from all other species, except *T. actiniæformis*, B.

600. *T. actiniæformis*, n. s.; stipitibus in massam cylindricam confluentibus, processibus setiformibus scabris; ramis paucis penicillatis lividis tortis apicibus laciniatis acutis. Spruce, n. 155.

About 2 inches high. Stems collected into a cylindrical mass below, white, rough with little pointed processes; branches few, forming a little brush, livid; ramuli twisted, slight, split at the tips, which are very delicate and sharp pointed.

The stem agrees with *T. trachodes* in the processes with which it is clothed; but the colour and habit are quite different. The tufts of fertile branches and the cylindrical stem remind one of some of the more elongated *Actiniæ*.

Index to the Sixth Century now completed.

Agaricus *Alpiniæ*, Berk., 509.
" *euomphalus*, ib., 504.
" *hypoleucus*, ib., 505.
" *marasmioides*, ib., 508.
" *Panurensis*, ib., 507.
" *psamminus*, ib., 506.
" *rudis*, ib., 502.
" *smaragdinus*, ib., 503.
" *Vespertilio*, ib., 501.
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Hexagonia *erubescens*, ib., 593.
" *gracilis*, ib., 592.
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" *decolor*, ib., 567.
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" *detritus*, ib., 572.
" *diabolicus*, ib., 553.
" *endothrix*, ib., 573.
" *evolvens*, ib., 588.
" *exilis*, ib., 549.
" *hemibaphus*, ib., 563.
" *hædinus*, ib., 584.
" *hypoplastus*, ib., 552.
" *luteo-nitidus*, ib., 556.
" *macer*, ib., 558.
" *marasmioides*, ib., 551.
" *martius*, ib., 575.
" *nephridius*, ib., 566.

A. Acrotrema Thwaitesii, *Hook. fil.* B. A. dissecta.

Vincent Brooks Imp.

Polyporus *nivosus*, ib., 570.
,, *ocellatus*, ib., 548.
,, *omphalodes*, ib., 547.
,, *pallidus*, ib., 559.
,, *pansus*, ib., 541.
,, *Parmula*, ib., 550.
,, *partitus*, ib., 542.
,, *passerinus*, ib., 557.
,, *pes-simiæ*, ib., 565.
,, *petalodes*, ib., 574.
,, *polydactylus*, ib., 569.
,, *porphyritis*, ib., 568.
,, *procerus*, ib., 545.
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,, *Sprucei*, ib., 590.

(*To be continued.*)

On Three New Species of ACROTREMA, *from Ceylon; by* J. D. HOOKER, M.D., F.R.S.

(Tab. IV.)

Since the publication of the first volume of the 'Flora Indica,' we have received many valuable contributions, including some new species, from our indefatigable correspondent, Mr. Thwaites; amongst these, none are more interesting than some species of *Acrotrema*, whose herbaceous habit and cut leaves are additional evidences of the near relation of the Order *Dilleniaceæ* with *Ranunculaceæ*.

1. Acrotrema *Thwaitesii*, H.f. et T.; pilosum v. glabratum, foliis lineari-lanceolatis pinnatifidis pinnatisectisve, segmentis lineari-oblongis acutis subdentatis, racemis brevissimis, bracteis lanceolatis, pedicellis gracilibus patentim pilosis.

Var. α. *pinnatifida*; foliis pinnatifidis v. basi pinnatisectis. (TAB. IV. *A*.)

Var. β. *pinnatisecta*; foliis pinnatisectis apice pinnatifidis, segmentis sæpissime basi contractis 3–4-lobatis.

HAB. In Zeylaniæ montosis, *Thwaites*, coll. 3364.

Rhizoma breve, horizontale, crass. pennæ corvinæ. *Folia* utrinque laxe pilosa v. glabrata, membranacea, 3–5 unc. longa, 1–1½ lata, in plantis junioribus margine lobulata vix pinnatifida, segmentis setaceo-

aculeatis marginibus paucidentatis. *Petioli* brevissimi. *Pedicelli* 1–1½ unc. longi. *Flores* ¼ unc. lati. *Sepala* hirsuta. *Ovaria* basi connata, multiovulata.

The varieties of this plant (sent under the same number by Mr. Thwaites) appear very distinct at first sight; but a careful examination of the evolution of the foliage shows that the characters which distinguish them are not specific.

Plate IV. *A.* Fig. 1, flower; 2, ditto, spread open; 3, stamen; 4, carpels; 5, vertical section of a carpel:—*all magnified.*

2. Acrotrema *dissectum*, Thwaites; sericeo-pilosum, foliis lanceolatis abrupte pinnatisectis, pinnis majoribus pinnatifidis segmentisque setaceo-acuminatis minoribus interjectis parvis lanceolatis inæqualibus, racemis brevissimis, pedicellis elongatis patentim pilosis. (Tab. IV. *B.*)

Hab. Prope Hellessee, ins. Zeylaniæ, *Thwaites*, n. 3393. Mai. 1855.

Rhizoma breve, crassiusculum. *Folia* brevissime petiolata, 3–5 unc. longa, 1 unc. lata, membranacea, subtus albido-sericea, pinnis breve gracile petiolulatis obovato-lanceolatis. *Flores* $\frac{1}{5}$ unc. lati. *Carpella* polysperma, seminibus grosse foveolatis.

3. Acrotrema *lyratum*, Thwaites; glabrum v. parce pilosum, foliis coriaceis basi pinnatifidis lobulis rotundatis despectis superne in laminam amplam oblongam obtusam basi cordatam dilatatis margine subdenticulatis, racemis longe pedunculatis, bracteis imbricatis recurvis, pedicellis elongatis floribusque glabris, ovulis plurimis.

Hab. In insula Zeylaniæ ad Hinidoon Korle, *Thwaites*, n. 3392. Mai. 1855.

Habitus et sæpe statura *A. Arnottiani*, Wight.—*Rhizoma* crassum, ascendens. *Folia* 3–10 unc. longa, lyrato-pinnatifida, laminæ parte superiore maxima, 2–7 unc. longa, 2–4 lata, nervis crassis horizontaliter patentibus apicibus furcatis, parte inferiore laminæ (v. parte superiore petioli) pinnatifida, segmentis parvis orbiculatis late adnatis despectis. *Petiolus* brevis, crassus, basi in stipula vaginante dilatata. *Inflorescentia* glabra. *Pedunculus* 1–3 unc. longus, nudus, superne bracteis imbricatis recurvis tectus, pedicelli 1 unc. longi, sæpe decurvi. *Flores* fere ½ unc. lati.

Variat *insigniter statura*.

Besides the above, we have from Mr. Thwaites one specimen of another *Acrotrema*, numbered 3114, which, with the leaves of *A. lanceo-*

latum, has the inflorescence of *A. uniflorum*, and may be different from either. The other two Ceylon *Acrotremas* are excessively variable plants; they are *A. lanceolatum*, Hook., of which Mr. Thwaites has lately sent specimens with obtuse apices to the leaves, and which we have under his numbers 253 and 2660; and *A. uniflorum*, Hook., of which Mr. Thwaites sends specimens with the leaves acute at the base; to this we have referred his numbers 239, 265, 693, 694, 1014, and 2659, several of which appear exceedingly dissimilar, but are united by intermediate forms from Walker and other collectors.

BOTANICAL INFORMATION.

Extract from the Report of DR. FERDINAND MUELLER, *the* Government Botanist of Victoria.

Botanic Gardens, Melbourne, 25th June, 1855.

Sir,—I do myself the honour of transmitting for communication to His Excellency the Governor my Third General Report.

Having received, in October, 1854, His Excellency's sanction for a more extensive phytologic exploration of the Australian Alps, I left for Gipps' Land on the 1st of November, 1854.

Whilst travelling along the banks of the La Trobe River and the Avon, I had ample opportunities for convincing myself that an extensive tract of that country, on account of the fertility of its soil, the mildness of its climate, and the facility of clearing land there for agriculture, is undoubtedly destined to become, when the internal communication there has been more facilitated, the abode of a large and prosperous population.

Proceeding along the ranges of the Avon, which are generally barren, scrubby, and in many places densely timbered, I ascended Mount Wellington, the most southern summit of the Australian Alps, on the 22nd of November, 1854, from whence I added some highly interesting plants to our botanical collections. At the elevation of about 4000 feet above the sea-level, or at a subalpine altitude, a striking change is perceptible in the vegetation, since the valleys and plateaus, stretching from Mount Wellington to the north, and more or less westerly and easterly, are well saturated with moisture, both from the attraction of

clouds, and from the dissolving snow, which, lying there for many months in the year, has given to these localities the appellation of "The Snowy Plains."

The route thus followed is the most practicable for penetrating from this part of Gipps' Land into the central mountains of the Alps, although an easier access yet may be found to them from Omeo, by following the generally grassy ranges to the westward from a few miles above the junction of the Livingstone River with the Mitta Mitta.

Proceeding on a second journey along the Darga, which flows through some luxuriantly grassed recesses of the mountains, I advanced through a difficult country to the Bogong Range, the culminating point of the westerly systema of the Snowy Mountains; a dense scrub, and the total absence of water on the crest of the Wentworth Ranges, rendering the progress tedious, until I reached the Dividing Range towards the sources of the Cabongra, where again the feature of the country changes on the northern slopes of the mountains, or along the sources of the Murray tributaries. Here open valleys give access to the central ranges in almost every direction, and a profusion of grass and water attracts cattle during the summer months far into these mountains. The low scrubby underwood disappears with Stringy-bark and Box, *Eucalypti*, and the dwarf forests of mountain Gum-trees, which replace them, may either be avoided or offer but little obstruction to the progress of a traveller.

According to a special report, which I had the honour of transmitting to the Government, dated Omeo, 16th December, 1854, I succeeded in reaching not only two of the main sources of the Mitta Mitta, but also the two most elevated heights of the Bogong Range; these perhaps not even previously trodden by the aborigines, since game and brushwood cease far below the summits. The two highest mountains, which I had the honour, by His Excellency's sanction, to distinguish as Mount Hotham and Mount La Trobe, are along the terminal ravines covered with eternal snow. It will be unnecessary to repeat here the respective bearings which I took from these all-commanding heights, since they are detailed in my special report; but it remains for me to confirm my computation with regard to their altitude. My calculations, based on the boiling-water point, proved, after my return, that the summits of the Bogong Range are unsurpassed by any other known of this continent, approaching to the altitude of 7000 feet above the level of the

ocean. A depressed Glacier Flora, imitating in some degree the botanical features of the European and other Alps, covers scantily the icy tops.

The bearings from the summit of Mount Tambo, instituted on the 17th of December, 1854, gave the position of Mount Hotham due W., of Mount La Trobe, W. 4° S.

From Omeo I resumed my journey into the north-easterly systema of our Alps, through a delightful subalpine country, opening into wide valleys at the main sources of the Snowy River, many of these valleys well adapted and partially used for summer pastures.

I ascended the most northern alpine hill of the Munyang Mountains on the 1st of January, 1855, and traversed in the weeks subsequent most of the principal elevations of these prodigious mountains, adding also there again not inconsiderably to our herbarium. Here on very many places the waters of the Murray and the Snowy River are rising in the closest proximity.

Descending, in the latter part of January, along the Snowy River to the lower country, I advanced as far easterly through the coast tract as the boggy nature of the country permitted, and I devoted my attention here again to the Flora of the Palm-tree Country, to improve my knowledge of the interesting plants discovered here previously in a more advanced season.

But the full botanical investigation of the south-eastern portion of this Colony, which, under the mildest climate, abounds in subtropical plants, can only be accomplished from the New South Wales frontier.

Returning from the Snowy River, I deemed it more promising to prosecute my operations on the coast, along which I proceeded to Lake King. Here I observed, amongst other rare and unknown plants, some fine trees of *Acronychia*, a genus known from Eastern Australia and New Caledonia, remarkable for its splendid wood, and the aromatic property by which the species are pervaded.

A most severe illness frustrated my intention of ascending Mount Bow Bow, a wild, rocky, isolated summit at the south-western slope of the Australian Alps, hitherto unexplored, and perhaps the only locality from which additions may be expected of importance to our knowledge of the Alpine Flora.

Reflecting on the general results of this journey, I trust to be justified in considering them not without some importance, at least for

the geography of plants. The expedition was planned more with a view of ascertaining the alliance between the vegetation of the Alps of Australia and plants of other countries, than with anticipations of largely enriching thereby the number of plants already under notice. Still, by referring to the enumeration annexed to this document, and to my former annual reports, it will be observed that the total amount of either truly alpine, or at least subalpine plants of this country, exceeds one hundred species, and it is pleasant to perceive that half of these are endemic, or not yet elsewhere discovered; whilst by far the greater part of the other half comprises such as inhabit Tasmania, or are likewise natives of New Zealand. A much smaller proportion is identical with plants found exclusively in New Zealand, or Lord Auckland's Group, or Campbell's Island. The genus *Drapetes*, for a long time only known in Fuegia, is now ascertained to exist, with other plants from the cold zone of South America, in the Australian Alps, New Zealand, Tasmania, and Borneo, and many other instances might be adduced to show the typical resemblance of many plants from the Alps of Australia with those of distant countries. As a most surprising fact in this regard, I beg to allude to the sudden reappearance of several European plants in the heart of the Australian Alps, plants which may be searched for in vain in the intervening country, viz.:—*Turritis glabra*, *Sagina procumbens*, *Alchemilla vulgaris*, *Veronica serpyllifolia*, *Carex pyrenaica*, *Carex echinata*, *Carex canescens*, *Carex Buxbaumii*, and *Botrychium Lunaria*. I may also advert to the occurrence of *Lysimachia vulgaris* in the Gipps' Land morasses as another singular instance of the enigmatic laws which rule the distribution of plants, and I cannot suppress my opinion that such facts tend to annihilate all theories in favour of migration of species from supposed centres of creation.

The Index which I have annexed comprises also a large number of Seaweeds, discovered by Professor Harvey, and adds thus 96 genera and 327 species to my previous enumerations, advancing the number of the former to 776, a sum which, as excluding all yet introduced plants, all Fungi, and many undetermined genera of the lower Orders, must be considered eminently large. The number of species ascertained to occur in Victoria exceeds, under the exclusions alluded to, already 2000. Excluding all Algæ, 15 genera have been added to the Flora of this Continent, two of them new to science—*Caltha*, *Howittia*, **Colobanthus*, **Dichopetalum*, *Pozoa*, **Diplaspis*, *Seseli*, †*Diodia*, **Ner-*

tera, **Decaspora*, †*Pæderota*, **Drapetes*, **Herpolirion*, **Astelia*, and **Andreæa*.

Seeds of native plants were collected, whenever obtainable, and have been distributed (in more than 1000 lots) with a view of increasing by interchange the supply for our own establishment to the best advantage. It is my pleasing duty to acknowledge here the valuable contributions for our gardens, received in return for my former collections, amongst which contributions those of Sir William Hooker, from the Royal Gardens at Kew, are prominent.

Engagements in the botanical perlustration of tropical Australia, for which His Excellency has been pleased to sanction my absence for the next and the current year, render it impossible to devote any time for the most desirable researches into the utility of so many of our native plants; but I have succeeded in finishing my systematic labours on the Flora of Victoria, so far as the material for it was accumulated, and an outline of the more interesting new plants has been furnished for the Journals of the Philosophical Society and the Victorian Institute. A more extensive information on our native plants was forwarded to Sir William Hooker, and I trust that, on account of the great alliance of the Victorian and Tasmanian plants, these manuscripts will prove to be useful in the elaboration of the Flora of Van Diemen's Land, which is now to be published, under the auspices of the Imperial Government, by Dr. J. D. Hooker.

A splendid collection of Algæ, procured on our shores by Professor Harvey, forms a valuable addition to our herbarium. The whole of the collections may at all times be consulted in the Botanic Garden; and I hope sincerely that the labour which I have bestowed on these collections will not be in undue proportion to the information which they are intended to convey.

A regular transmission of botanical specimens to Kew has also been continued. Steps have likewise been taken to procure from other countries such plants as promise to become of use to the colony; and it is gratifying to know that Nature has favoured us with a soil and with a climate in which all treasures of the vegetation dispersed through extratropical countries may be reared in perfection and abundance.

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* Those thus marked had previously been detected in Tasmania.

† These do not belong to the genera to which they are referred.

NOTICES OF BOOKS.

Géographie Botanique Raisonnée, *ou Exposition des Faits principaux et des Lois concernant la Distribution Géographique des Plantes de l'époque actuelle; par* M. Alph. de Candolle. 2 vols. 8vo. Paris.

(*Continued from p.* 191.)

Concluding remarks.

We have now concluded the agreeable task we undertook, of passing under review the principal features and some of the principal facts contained in M. de Candolle's valuable work. This we have been the more willing to do from the conviction that, owing to its great bulk, and the considerable amount of botanical knowledge required to follow any part of it, the chances of its perusal by the general reader are much smaller than its merits deserve, and we would try to assure M. de Candolle that he would confer a further benefit upon scientific botanists, and diffuse a knowledge of the curious and difficult subject he has shown himself so well able to discuss amongst a large class of intelligent readers, if he would prepare a condensed edition of his work. In its present form it is too encyclopedic in extent and too diffuse in style to become an introduction or text-book on the one hand, or a work for general reading on the other. In the second volume especially there is a good deal of repetition, and unnecessary subdivision of the subject into chapters, articles, and sections.

The Articles devoted to a few Meteorological questions and to the Geographical origin of cultivated plants are, however excellent in themselves, out of place as here treated in detail, and would make good foundations for separate treatises. In their present shape they cannot be said to throw any light upon Botanical Geography, nor do they indicate any new laws nor suggest any new modes of searching for them. The absence of originality indeed throughout the volumes is perhaps not their least striking feature, and is to be attributed to the comparative barrenness of the subject in this respect, and not to any lack of ingenuity, and still less of knowledge or industry, on the part of the author; and yet it appears that some perfectly original course of study must be adopted or some new ideas must be conceived, in relation to the subject of Botanical Geography, before further advance can be attained in the direction now being followed,—some such bold

original ideas as led Lyell first to conceive and then to prove that species may be older than the lands which they now inhabit, and that led Edward Forbes to seek in the distribution of the fossil remains of existing British species a key to their present diffusion.

It remains to say a few words upon the general subject of Botanical Geography. It is no fault of M. de Candolle's work that we lay it down more impressed than ever with the vagueness of its principles, the inexactness of its methods, the puzzling complexity of its phenomena, and the purely speculative character of those hypotheses upon which all inquirers base their efforts to explain its facts and develope its laws.

Much stress is laid upon the value of Meteorological observations, but there is no method of tabulating these that offers a prospect of their being applied to the solution of any one general question in the distribution of species. Certain plants will not survive temperatures above or below a given number of degrees; or in other words, certain sums of temperatures are necessary to the fulfilment of their functions: this all the world knows; but the tabulation of these temperatures has hitherto led to no general laws, for not every family of plants, nor every genus, nor even every species, but often every variety or race, must have its own sum of degrees to ensure its continued existence. Nor is this all: the sum of degrees must extend annually over a certain definite period of the year, and must be accompanied with so many favourable conditions of soil, light, moisture, and purity of air, that the mere question of temperature becomes a very subordinate element, however accurately ascertained. So far, then, as Meteorological observations are concerned, we must consider that, however accurate they be, they have hitherto admitted of no exact practical application with reference to the distribution of species, nor have they even indicated a theoretical approximation to it.

Next with regard to the limitation of species, genera, and families, within certain areas; this again is subject to no appreciable laws; plants are no doubt governed in their diffusion by conditions of climate and soil, and are dependent for their diffusion on their own powers of endurance, on the time that has elapsed since they first existed as species, on the elements, on the motions of animals, and on geological changes; but we not only know nothing in any case of the time elapsed, and next to nothing of the geological changes they may have survived, but all our attempts have failed to regulate their distribution

in elevation or latitude or longitude, by climate, or soil, or other external conditions. Species, Genera, and Orders stop, we see not why, and often reappear where we least expect them. Under this head too must be noticed the fact that there is none of that recognizable relation between structure and function, or structure and external conditions, in the vegetable kingdom that there is in the animal, and which often enables us to account for a fact in the distribution of an animal by another in that of a plant. We see the limit of some animal's distribution coinciding with that of the plant it lives upon or under, or that nourishes a third animal it preys upon; but we never see the plant stopped by or for the animal. There are comparatively few evidences of plants being structurally better suited to one situation than to another, with the exception of a few conspicuous classes, as water-plants, epiphytes, parasites, etc.; and hence our power of accounting by physical causes for the facts of Botanical Geography is extremely limited.

If, again, we turn from those branches of the subject, in reasoning upon which we make use of facts and observations however inexact or difficult of application, to the fundamental principles upon which the study is based, and from some of which we must start in all our investigations, we enter at once into the regions of pure speculation. Nor can there be better proof of the facts and hypotheses advanced being insufficient to explain Geographical distribution, than is afforded by the circumstance that even M. de Candolle, with all his philosophy and desire to arrive at exact conclusions, is compelled to resort to the unphilosophical proceeding of demanding the operation of two laws to account for each of the two primary phenomena connected with the creation of species.

Thus, with regard to their origin, he considers that most are special creations, but that some are the offsprings of transmutations; and with regard to the number created and place of creation, that some are created as solitary individuals or as a plurality of individuals in one place only; and that others are (simultaneously?) created in several more or less distant localities.

We are told that the majority of species were created such as they now exist, but there is not a shadow of a proof of this. No amount of acute observation or critical disquisition throws real light upon this subject, upon which men of science are completely at issue; nor is there in the present state of science any prospect of naturalists

agreeing upon it. There are, as it appears to us, two broad facts, and only two, to which all naturalists must turn who seek some foundation for an opinion as to the origin of species, and these lead to diametrically opposite conclusions. They are, on the one hand, that a great number of specific forms are hereditary in as far as our experience allows of our judging; on the other, that a great number are extremely variable, and that races with characters as strongly marked as those of species are constantly being produced under our eyes. . . . .

M. de Candolle belongs to the school who attach most importance to the first fact, and he has put every argument that can be brought forward in support of the conclusion to which it leads in the clearest manner. He has also attended to all the facts that militate against it, and if we do not think he has given them due prominence, it is from no want of candour on his part, but solely from our considering that he is not aware of their extent. We believe that species are very much more variable than he does, and that the number of proved and probable permanent races (now regarded by most naturalists as species) is much more numerous also. We do not indeed consider that the question of species being definite creations is hence disposed of; for if true, it proves no more than that there are fewer species than some Naturalists suppose. . . . .

Let us now treat this side of the question upon its own merits. Its advocates start with the fact that species are variable, and they assert that this statement requires no qualification, whereas that of their hereditary distinctness demands the qualification of "within our experience." But it has been shown that existing causes, and the range of "our experience," will not account for a single fact in the present distribution of species, nor for the geographical origin of any, nor for the amount of variation it has undergone, nor will it indicate the time when it first appeared, nor the form it had when created; in many cases it will not even help us to discriminate a species from a variety, or a hybrid from a species, or a monster from a perfect plant. What, then, the opponent of the theory of definite creations asks, is the value of the range of "our experience" in so momentous a question as this. Time and altered conditions have, he says, within our experience, produced races that have not reverted to their typical form; it is allowed by the advocates of special creations, that these have operated from periods which antedate the range of our experience, in confounding

some races with species, beyond the probability of their being ever discriminated;—and that more time and more altered conditions should suffice to effect such further change as to produce the many existing vegetable forms out of a few pre-existing ones, seems to him a perfectly legitimate conclusion. He argues too, and with great plausibility, that this theory of transmutation accounts better for the aggregation of Species, Genera, and Natural Orders in geographical areas, and for their limitation; whilst he leaves it to geological change, and altered climatal and other physical conditions, to account for their subsequent segregation and ultimate destruction.

We have hitherto treated the question as naturalists cannot help doing, trammelled with facts and difficulties that have a different value in different naturalists' eyes; but the general inquirer, who has nothing to do with facts, and knows nothing of species or varieties, will treat it in what appears to him a more philosophical manner: he will ask himself whether it is most accordant with the operation of Natural Laws, that the Oak-tree or Acorn should have appeared suddenly, as a special creation, on the surface of the globe, or be an altered form of a pre-existing tree, of greater or less complexity of structure; and will doubtless choose the latter hypothesis as involving less of the marvellous at first sight, and appearing to explain the mystery of creation. But unfortunately transmutation brings us no nearer the origin of species, except the doctrine of progressive development be also allowed,* and, as we can show, the study of plants affords much positive evidence against progressive development, and none in favour of it.

The main facts of Fossil Botany, though few, are well established, and their significance in relation to the question of progressive development is, we think, quite clear. They are—

That *Lycopodiaceæ* existed, and are amongst the earliest known land-plants (in the Carboniferous period).

That they were accompanied by many genera and species of Ferns.

* *Apropos* of this argument, as applied to account for the origin of species, we may quote the opinion of the able author of an article in the *Medico-Chirurgical Review*, on the well-known 'Vestiges of the Natural History of the Creation:'—"If, with the Progressionists, we conceive that species of living beings undergo transmutation at the present day; that this transmutation is from a lower to a higher type; and that all the kinds of living beings which have ever existed upon the earth's surface have originated in this way; the idea is a perfectly legitimate one, and must be admitted or rejected according to the evidence attainable: but if fully proved, it would not be, in any intelligible sense, an *explanation* of creation: such 'creation in the manner of natural law' would, in fact, simply be an orderly miracle."

That *Coniferæ* are the only other Natural Order, of whose existence, at the same period, there are any very strong indications.

That *Cycadeæ* existed abundantly at the period of the Lias and Oolite, if not earlier, along with the above-mentioned Families.

That various other Dicotyledonous Natural Orders existed in the time of the Chalk.

The interval of time embraced within these periods, whether greater or less than has since elapsed, is sufficient to ensure our not taking too limited a view as regards time; the botanical facts again are incontestably the leading ones of those periods; and the conclusions to be derived from a study of them are—

That the various Dicotyledonous Natural Orders of the Chalk afford no proof of being higher nor lower in development than those of the present day, but much of their being equal in rank; that the *Cycadeæ* of the Lias and Oolite are certainly as highly organized as their existing allies; that the *Coniferæ* are too imperfect to afford the smallest evidence of their relative development; that the Ferns of the Oolite and Coal are as highly organized as those of the present day; and that the *Lycopodiaceæ* of the Carboniferous epoch are, in general structure, the same with those now existing, but were very much more highly developed in stature and organization.

It is further to be remarked that the above Natural Orders embrace some of the most highly organized in the vegetable kingdom; though with regard to that which we consider as amongst the very highest, namely the *Coniferæ*,* the evidence is the most incomplete as to the perfection of its members, as compared with those now existing.

The only arguments hitherto adduced in favour of progressive development, drawn from the vegetable kingdom, are, we think, very

* That the *Coniferæ* occupy so high a place in the scale of Phænogamic plants as we would assign them, will be disputed by those who attach more importance to their defective floral envelope and ovary, than to the astonishing complexity of their reproductive organs, the perfection of their woody tissues, the rarity or absence of spiral vessels, except in their rudimentary tissues, their physiological peculiarities, and especially the slow development of the pollen-tube, etc., and operation of fecundation. In the development of their ovules and pollen they rank far above all other flowering plants, as also in the anatomy of their wood, and their numerous cotyledons, etc., whilst in all that regards the structure of their seed, their germination, and the development of their axis, they are perfectly and typically Dicotyledonous, Exogenous, Exorhizal, and Acramphibryal. Besides these points, *Gnetum* has both a perianth to the male flower, and either a perianth or ovary to the female, for the external covering of the ovule is certainly not (as Griffith supposed) a primine: so that if the group of Gymnosperms be retained, its characters must be modified.

easily disposed of; the first of these is the assumed presence of *Algæ* in rocks older than those containing land-plants. Now the presence of *Algæ* in the water is no proof of the absence of land-plants, and the *Algæ* may, if present, have been more highly organized than any now existing; but we have seen no evidence of *Algæ* amongst the so-called Fucoids of the protozoic rocks; what we have seen to be so called are appearances that pass the inventive powers of palæontologists to explain naturally, are sometimes inorganic matters, and at others, casts of *Bryozoa* whose structure is lost. In no case does a so-called Fucoid present any proof of being an *Alga;* in most cases it is so considered only because it is not recognized by the zoologist as belonging to his kingdom.

The second argument is the assumed inferiority of the Gymnosperms, which we dispute; and the third is the assumed absence of any Angiospermous Dicotyledons, or of Monocotyledons below the Chalk, and which was a few years ago assumed of the Chalk also. But not only are there indications of true Palms, and of other Orders, in the Coal, but the capital experiments of Lindley, who tested the powers of resisting decay, possessed by various Natural Orders, show that Ferns, *Coniferæ*, *Lycopodiaceæ*, and *Cycadeæ*, are the most imperishable under water, which, taken with the fact that the formation of coal is due, in part at least, to a local and not to a promiscuous assemblage of plants, representing the vegetation of the period; and the force of the very weak argument, founded on the absence of certain Orders, is reduced to a shadow.

The only other theoretical point to which we shall allude, is the appearance of species (whether as creations or transmutations) in one spot or in many spots. Here again we have no evidence to guide us, and can only assume a position, as in the former cases, upon the broadest view of the facts of distribution; now it is undisputed that the most prominent feature in distribution is that, as a general rule, species are grouped in more or less restricted areas, after a manner that is quite consistent with the hypothesis of their having spread from one spot. The exceptions may be very numerous, and the question remains, how may those cases be most easily accounted for which cannot be explained by migration; if by a double creation of the same species, we wander further into the regions of pure hypothesis; but if by transmutation, we may assume that the power that species have of forming races, has been developed at two or more spots instead of one. This demands

less of the marvellous than the hypothesis of a double creation, and allows more latitude for variation: for whereas it is adding miracle to miracle to assume the same species to be created not only at two or more spots, but at two or more times, and under two or more forms; it is but extending one law now in operation to suppose that this would happen if transmutation thus gave origin to races and species; for the conditions that induce the change, and hence the race, need not have occurred at the same time at two or more spots, nor when they did occur would they act with equal power or upon exactly similar individuals, whence the individual races would not be altogether similar.

We have thus endeavoured to put the argument in favour of transmutation in as strong a light as we believe it to be capable of bearing in the existing state of our knowledge. For our own part we confess that we see no more means of forming an opinion on the subject of the origin of species, than we do of the origin of time; whether they are all suffering transmutation or not, appears to be immaterial as regards the progress of botanical science; on the one hand we cannot treat practically of the species of plants, either systematically or physiologically, save under the assumption that most are hereditarily permanently distinct; and on the other, we cannot study any species or organ physiologically or morphologically without being strongly impressed with the fact that variability is an ever-operating law.

Species of plants are so far constant as to admit of their being treated upon the whole as if they were permanent creations; and though so plastic under altered conditions, they are capable of better and more natural systematic arrangement and circumscription by characters than minerals, climates, or diseases. The difference between the views of those who advocate the theory of the creation of species by transmutation, and those who believe in a special creation, is very wide perhaps, but not so wide as to allow of their employing different methods towards the advancement of Botany in any one of its departments. For ourselves, we believe that fully one-half of the registered species of plants are reducible to races or varieties; with regard to the other half, whatever their origin may be, they are, in comparison, permanently distinct as species. That these species do run into varieties; that two or more of them may have originated in an altered state of some pre-existing form, or may in the course of ages assume still other forms, is perfectly intelligible; but for any such species so to change as to assume all the characters of another within the limits of our ex-

perience, is for Nature to break one of her best-established laws: *Natura nihil facit per saltus.*

A Popular History of BRITISH LICHENS, *comprising an Account of their Structure, Reproduction, Uses, Distribution, and Classification; by* W. LAUDER LINDSAY, M.D.

Dr. Lindsay has been for some time favourably known to British Lichenologists through his various researches into the history and uses of British Lichens, which have been read before the Botanical Society of Edinburgh; these had prepared us to expect a very superior work in his 'British Lichens,' nor have we been at all disappointed. The book forms one of Mr. Reeve's Popular Series, and is by very far the best of these that has hitherto appeared, and, though more scientific than its name implies, it is perhaps not more so than any work of the kind should be, to be really a safe and useful guide. We are of those who think that there is no royal road to Botany, and that there is no path but a laborious one open to an accurate acquaintance with the Cryptogamic branch of it; and we further think that any attempt to popularize Botany by writing down to the understandings of those who will not learn the alphabet and grammar of the science, is sure to end in disappointment. We are therefore by no means sorry to see Dr. Lindsay's work carried out in a scientific manner, though we could have wished that he had substituted English for many Latin words.

The subjects discussed are well arranged in six chapters, and contain many original remarks, and are interspersed with full citations of authorities and interesting anecdotes. The Introduction to Lichenology and its History are carefully and well written, and the botanical parts are accurately done and systematically arranged; and the chapters on economic application, distribution, classification, etc., are very clear and good. The work is illustrated by twenty-four excellent coloured plates, which show Dr. Lindsay to be equally skilful as a microscopist and an artist, and thoroughly conversant with his subjects; but it is deplorable to find these scattered through the letterpress, without names attached, or references either in the index or in the body of the work! It is a wrong both to the author and to the public so to arrange good plates as that they shall be of the least possible utility, and appear to be intended rather to catch the eye of a purchaser than to enlighten the understanding of those for whose instruction they are designed.

A List of the Musci *and* Hepaticæ *collected in* Victoria, Australia, *by* Dr. F. Mueller; *by* Wm. Mitten, Esq.

I. Andreæaceæ.

1. Andreæa *Australis*, F. Mueller, MSS.; dioica, caule elongato-ramoso, foliis patentibus ovatis ovato-lanceolatisque acutatis nervo excurrente, perichætialibus late ovatis acuminatis nervatis omnibus minutissime areolatis lævibus, theca exserta ad $\frac{3}{4}$ fissa.

Hab. Munyang Mountains. (No. 23, 85, 1855.) Australian Alps. (No. 16.)

Nearly resembling some of the larger states of *A. Rothii*, var. *Grimsulana*, but distinct from it in the wider, suddenly sharpened apices of its leaves, their narrower, more distinct nerve, and far more minute areolation. The inflorescence appears to be truly dioicous.

II. Bryaceæ.

1. Dicranoideæ.

2. Pleuridium *nervosum*. (Phascum, *Hook.*) (No. 82, 1855.)
3. Leptotrichum *flexifolium*. (Dicranum, *Hook.*) (No. 17, 64, 1855.)
4. L. *affine*, C. Mueller. (Trichostomum setosum, *Hook. fil. et Wils.*) (No. 19, 66, 72.)
5. Dicranum *tenuifolium*, Hook. fil. et Wils. (No. 12, 44, 82, 1855.)
6. D. *Billardieri*, Schw. (No. 3, 98, 105,—149, 1855.)
7. D. *Menziesii*, Tayl. (No. 63,—46, 100, 1855.)
8. D. (Campylopus) *torfaceum*, B. et S. (No. 30, 1855.)
9. D. (Campylopus) *introflexum*, Hedw. (No. 75, 80, 1855.)
10. Leucoloma *Sieberi*, Brid. (No. 119.)
11. Didymodon *papillatus*, Hook. fil. et Wils. (No. 136.)

The decurrent portions at the base of the leaf of this Moss equals half its length.

12. Ceratodon *purpureus*, Brid. (No. 10, 33, 42, 68, 71, 75, 94,—50, 70, 129, 1855.)
13. Holomitrium *perichætiale*, Brid. (No. 128.)
14. H. *cirrhatum*. (Weissia, Hedw.) (No. 65, 1855.)

Although Bridel made some mistakes about the characters of his genus *Olomitrium*, no good reason has yet appeared why it should be rejected, particularly as Hornschuch has added to it some others inti-

mately allied to the original species; besides which there should be added *Weissia crispula*, Hedw., *W. compacta*, Schw., *W. fastigiata*, Taylor, *W. tortifolia*, Hook. fil. et Wils., *W. pomiformis*, Hook., *Syrrhopodon Dregei*, Hsch., and *S. clavatus*, Schw., all agreeing closely in habit and in the structure of their leaves and fruit; from *Weissia*, as represented by *W. controversa*, they recede in the cell-structure of the leaves, which approaches very nearly to that of *Dicranum*, without however having the glossy appearance usual in that genus.

2. POTTIOIDEÆ.

15. Phascum *cylindricum*, Tayl. (No. 127, 1855.)
16. Weissia *flavipes*, Hook. fil. et Wils. (No. 60,—77, 1855.)
17. Desmatodon *nervosus*, B. et S. (No. 132,—41, 146, 1855.)
18. D. *adustus*, Mitten; dioicus, caule gracili ramoso, foliis patentibus ovatis acutis concavis margine maxime revoluto, nervo crassiusculo excurrente, dense papillosis, perichætialibus latioribus tenuioribus margine non reflexis, theca in pedunculo gracili elongato cylindrica erecta, operculo conico-rostrato.

 HAB. Gipps' Land. (No. 78, 1855.)

 Near to *D. Schimperi*, Mont., but differs in its wider, acute leaves, not cucullate and obtuse, and in the shorter and broader perichætial leaves. The peristome appears to have the same structure.
19. Tortula *calycina*, Schw. (No. 9, 43, 127, 147,—40, 73, 1855.)
20. T. *Tasmanica*, Hampe. (No. 149,—165, 1853.)
21. T. *Hornschuchiana*, Schultz. (No. 33.)
22. T. *luteola*, Mitten; dioica, caule erecto ramoso, foliis patentibus lanceolatis ovato-lanceolatisve obtusis nervo in mucronem flavum excurrente, perichætialibus ovato-lanceolatis sensim acuminatis, theca in pedunculo aurantiaco cylindrica, operculo subulato, annulo simplici, peristomio dentibus e basi brevissime coadunato longiusculis pluries contortis.

 HAB. Yarra. (No. 132, 1855. No. 47.)

 Larger than *T. unguiculata*, and distinct from it in the subulate points of its perichætial leaves; in other respects very closely allied to it, and like it very variable in the width of its leaves.
23. T. *Australasiæ*, Hook. et Grev. (No. 35, 142.)
24. T. *serrulata*, Hook. et Grev. L.
25. T. *princeps*, De Notaris. (T. Mülleri, *Bruch*.) (No. 37, 116, 1855.)

26. T. *papillosa*, Wils. (No. 121.)

The fertile specimens present no differences from the barren plant found in Britain. The seta is thick, about four or five lines long, the capsule cylindric, the operculum about two-thirds as long as the capsule, the peristome that of *Syntrichia*—the tubular portion being one-third of its whole length. Gemmæ are, as usual, present on all the leaves, excepting those of the fertile stems.

27. Encalypta *ciliata*, Hedw.? (No. 79, 1855.)

Without calyptra or operculum, but appearing to belong to this species.

28. Grimmia *pulvinata*, Hook. et Tayl., var. *β Africana*. (No. 20, 36, 37, 48,—76, 1855.)

29. G. (Racomitrium) *lanuginosum*, Brid. T.

30. Zygodon *Brownii*, Schw. (No. 3,—41, 1855.)

31. Z. *intermedius*, B. et S. (No. 17.)

32. Z. *Menziesii*. (Codonoblepharum, *Schw.*) (No. 45.)

33. Orthotrichum *Tasmanicum*, Hook. et Wils. (No. 21,—39, 1855.)

34. Macromitrium *microphyllum*, Hook. et Grev. (No. 14, 122.)

3. FUNAROIDEÆ.

35. Physcomitrium *pyriforme*, Brid. (No. 58,—95, 1855.)

36. P. *firmum*, Mitten; caule elongato, foliis obovatis obtusiusculis caviusculis, nervo tenui sub apice evanescente, margine subintegerrimo, perichætialibus conformibus, theca in pedunculo crassiusculo pyriforme ore amplo.

HAB. Dilalili. (No. 80.) Rare.

Leaves shorter, wider, and more concave than those of *P. pyriforme*, cells shorter, those of the margin minute, substance of the leaf firmer. The seta appears to be slightly curved. The operculum and calyptra are absent.

37. Entosthodon *apophysatus*. (Physcomitrium, *Taylor.*) (No. 131,—120, 1855.)

38. E. *laxus*. (Physcomitrium, *Hook. fil. et Wils.*) (No. 132, 1855.)

The old capsules on these specimens are obovate, the neck rather inflated, not gradually tapering into the seta, which is about half an inch in height.

39. Funaria *radians*. (Weissia, *Hedw.* F. glabra, *Taylor.*) (No. 119,—81, 1855.)

40. F. *hygrometrica*, L. (No. 123, 1855.)

41. Eremodon *Octoblepharis*, Hook. (No. 13, 15, 104, 105, 109, 129.)

42. Meesia *macrantha*, Mitten ; monoica, cæspitosa, caule ramoso breviusculo, foliis lanceolatis obtusis margine recurvis nervo sub apice evanido, perichætialibus longioribus, theca in pedunculo elongato pyriformi curvula, operculo conico obtuso, peristomio externo dentibus brevibus obtusis, interno processibus longis carinatis rugulosis, flore masculo in ramulo brevi, foliis perigonialibus latissime ovatis acuminatis obtusis.

HAB. "In sphagnetis Montis Cobboras rarissima."

Similar to *M. uliginosa*, but its leaves are wider, with wider cells, and the margin plane or recurved, but not reflexed. The perigonial leaves are remarkably wide at their bases, and the male flower large for the size of the Moss.

4. BARTRAMOIDEÆ.

43. Bartramia (Bartramidula) *curvirostra*, Mitten ; monoica, conferte cæspitosa, caule brevi ramoso, foliis erecto-patentibus lanceolatis margine apicem versus remote serratis, nervo crasso dorso denticulato apice in mucronem subulatum lævem excurrente, perichætialibus longioribus lanceolato-subulatis nervo tenuiore, theca in pedunculo brevi flexuoso sphærica lævissima ore parvo gymnostoma, operculo conico-subulato incurvo, flore masculo in ramulis terminalibus innovatione laterali.

HAB. Australian Alps. (No. 83.) Munyang Mountains. (No. 83, 1855.)

Resembling *B. Wilsoni*, B. et S., but the whole plant a little more robust, the seta thicker, the operculum as long as half the diameter of the capsule, and always much incurved.

44. B. (Conostomum) *pusilla*, Hook. fil. et Wils. (No. 31, N.—43, 1855.)

45. B. (Philonotis) *appressa*, Hook. fil. et Wils. (No. 9, 1855.)

The capsule of this curious species is globose, sulcate, and rather large for the size of the Moss, the operculum conic. The peristome appears to be normal, but rather tender. The whole plant is of an ashy-green colour and everywhere densely papillose ; it is not very closely allied to *B. laxissima*, C. Mueller.

46. B. (Philonotis) *fertilis*, Mitten ; monoica, caule elongato gracili

ramoso, foliis patentibus e basi ovata lanceolato-subulatis margine ubique serrulatis nervo percurrente dorso scabro, e cellulis laxis areolatis, perichætialibus magis subulatis subintegerrimis, theca in pedunculo elongato oblonga plicata operculo conico, peristomio normali, flore masculo foliis perigonialibus acutis terminale fœmineis pluribus cincto.

HAB. Bogong Range. (No. 112.) Australian Alps. (No. 133, 1855.)

In size not unlike *B. tenuis*, Tayl., but more nearly allied in the monoicous inflorescence to the species I understand as *B. radicalis*, in which however the leaves are not more than half so wide.

47. B. (Brentelia) *affinis*, Hook. (No. 1, 54, 57, 63, 65—35, 1854.)

48. B. (Brentelia) *pendula*, Hook. (No. 72.)

49. B. (Eubartramia) *Halleriana*, Hedw. (No. 4, 1855.)

50. B. (Vaginella) *papillata*, Hook. fil. et Wils. (No. 140, 157, AA.—28, 38, 74, 1855.)

5. BRYOIDEÆ.

51. Orthodontium *lanceolatum*, Mitten; monoicum, caule brevissimo, foliis patenti-recurvis lineari-lanceolatis planiusculis, nervo sub apice evanido, theca in pedunculo gracili recto ovali, collo pyriformi attenuato, operculo conico rostrato, peristomio *O. Australis*.

HAB. Mount Wellington, Gipps' Land. (No. 61.)

Less than *O. Australe*, with leaves twice as wide, and less narrowed upwards. Capsule erect, with a longer neck, scarcely striate.

52. Mielichhoferia *Eckloni*, Hsch. (No. 126, 1855.)

53. Bryum (Wehera) *nutans*, Schreb. (No. 17, 1855.)

54. B. *Billardieri*, Schw. (No. 44,—11, 34, 1855.)

55. B. *truncorum*, Brid. (No. 15, 31, 52, 160, 174, 175,—27, 1855.)

56. B. *torquescens*, B. et S. (No. 10, 11, 37, 79, 137.)

57. B. *crassinerve*, Hook. fil. et Wils. (No. 53, 1853.)

58. B. *lævigatum*, Hook. fil. et Wils. (No. 67, 1855.)

59. B. *duriusculum*, Hook. fil. et Wils. (No. 124, 1854.)

60. B. *balanoides*, Tayl. (No. 134, 179.)

I believe this to be a form of the species known in Europe as *B. atropurpureum*, Web. et Mohr, and of which the oldest name is *B. dichotomum*, Hedw.

6. MNIOIDEÆ.

61. Fissidens *brevifolius*, Hook. fil. et Wils. (No. 17, 32, 130.)

62. F. *tenellus*, Hook. fil. et Wils. (No. 113.)
63. F. *rigidulus*, Hook. fil. et Wils. (No. 145.)
64. F. (Conomitrium) *Dillenii*, Mont. (No. 30.)
65. Aulacomnion *Gaudichaudi*. (Leptotheca, *Schw. Supp. p.* 135. *t.* 137. Brachymenium ovatum, *Hook. fil. et Wils. in Fl. Antarct.*)

Certainly dioicous, as might be supposed from fig. 7 and 8 in the plate above quoted, the synoicous flower probably an accidental mistake. The capsule becomes plicate, as in *A. androgynum*, to which species the present has a close resemblance, but its foliage is of a firmer substance. The internal peristome consists of processes on a rather short base, with the intermediate cilia combined into one, and shorter than the processes, which equal the length of the teeth. No pseudopodia are present amongst these specimens.

66. Hymenodon *piliferus*, Hook. fil. et Wils. (No. 171.)
67. Mnium (Rhizogonium) *distichum*, Brid. (No. 109.)
68. M. (Rhizogonium) *Hookeri*, C. Mueller. (No. 7, 1855.)
69. M. (Rhizogonium) *Paramattense*, C. Mueller. (No. 7.)
70. Leptostomum *inclinans*, Brown. (No. 4, 102.)

7. POLYTRICHOIDEÆ.

71. Polytrichum (Atrichum) *ligulatum*, sp. nov.; dioicum, caule elongato, foliis longe ligulatis margine crassiusculo duplicato-serrato, nervo lamellis brevissimis dorso spinoso, theca in pedunculo elongato gracili cylindrica erecta parum arcuata, peristomio *A. angustati*.

HAB. Bornip Creek. (No. 8, 12.) Tarwin. (No. 121.)

Agrees with *P.* (Atrichum) *angustatum*, Hook., in size and general appearance, but its leaves are broader towards their apices, the thickened margin twice as wide, and when dry not involute. The operculum and calyptra are wanting.

72. P. *alpinum*, L. (P. australpinum, *F. Mueller, MSS.*) (No. 105, 135, 1855.)

I have not observed any difference between this and European specimens.

73. P. *juniperinum*, Hedw. (No. 1, 25, 71, 1855. No. 31, 1852.)
74. P. *commune*, L. (No. 69,—118, 1855.)
75. Dawsonia *superba*, Grev. (No. 149.)

8. HYPNOIDEÆ.

76. Hedwigia *ciliata*, Hedw. (No. 124, 1855. CC. 1854.)

77. Cryphea *dilatata*, Hook. fil. et Wils. (No. 107, 1855.)

78. Esenbeckia *cuspidata*, Mitten; dioica, caule repente, ramis subsimplicibus flexuosis, foliis patentibus octofariis oblongo-lanceolatis concavis profunde quadriplicatis margine remote denticulatis brevissime binervatis, perichætialibus vaginantibus subulato-attenuatis, theca ovali cylindrica basi abrupte in pedicello brevi contracta, operculo conico acuminato, calyptra mitræformi basi inflexa, peristomio dentibus rugulosis processibus solidis æquilongis ciliis rudimentariis interpositis.

HAB. Moreton Bay. August, 1855.

With the same habit and structure as *E. plicata* and *E. elegans* (Endotrichum, *Dzy. et Molkenb.*), but its leaves are closely imbricate, not at all flexuose, so that the stems appear terete.

79. Neckera *leptotheca*, sp. nov.; monoica, ramis elongatis inordinatim pinnatis complanatis, foliis e basi minute auriculato-asymmetricis oblongo-lanceolatis obtusiusculis minute serrulatis undulatis brevissime binerviis, perichætialibus vaginantibus subulato-acuminatis apice dentatis, theca emergente ovali leptoderma, operculo conico-rostrato, peristomio dentibus angustis rugulosis siccitate inter processibus æquilongis hyalinis carinatis solidis nitidis porrectis inflexis.

HAB. Broad Rib River, D. Cabbage-tree River. (No. 93.) Tarwin. (No. 103, 1855.)

Very near to *N. pennata* and to *N. Ehrenbergii*, but differing in the small, pale, thin capsules, which are about half-covered by the perichætial leaves, when de-operculate they become urceolate.

80. Phyllogonium *elegans*, Hook. fil. et Wils. (No. 110.)

81. Isothecium *molle* (Leskea, *Hedw.*). (No. 101.)

82. I. *ramulosum*, Mitten; dioicum, caule repente, ramis dendroideis arcuatis eleganter bi-tri-pinnatim ramosis, foliis in ramis subdistichaceis, in ramulis undique imbricatis, ovato-oblongis brevi-acuminatis integerrimis concavis nervo furcato solitario v. nervis binis brevibus instructis, e cellulis elongatis angustissimis extremitatibus rotundatis areolatis, perichætialibus lanceolatis patulis, theca in pedunculo brevi arcuato rubente ovali, operculo conico acuto, peristomio normali *Hypni*.

HAB. Victoria. (No. 170.) Steep-bank River. (No. 58.)

A smaller Moss than *I. arbuscula*, Hook., with more numerous and gradually attenuated ramuli. The capsule is on a longer, arcuate seta, and horizontal.

83. I. *cochlearifolium*. (Hypnum, *Schw.*) (No. 112.)

This is *H. clandestinum*, Fl. Nov. Zeland., but it corresponds with Schwægrichen's figure; and *Hypnum cochlearifolium*, Fl. Nov. Zeland., seems to be only a larger form of the same Moss.

84. Leucodon *Lagurus*, Hook. (No. 21, 111, 136.)

85. Pterigophyllum *nigellum*, Hook. fil. et Wils. (No. 61, 167.)

86. Climacium *sulcatum*, Brid.

Hab. Brisbane River, 1855.

87. Hypnum *cupressiforme*, Dill., var. *minus*. (No. 2, 38, 51, F.—13, 104, 1855.)

88. H. *Sandwicense*, Hook. (No. 168, 1854.)

89. H. *leptorhynchum*, Brid. (No. 6, 76, 173.)

90. H. *cerviculatum*, Hook. fil. et Wils. (No. 59.)

91. H. *uncinatum*, Hedw. (No. 5, 1855.)

92. H. *homomallum*, Hampe. (No. 6, 40, 41.)

93. H. *auriculatum*, Mont. (H. chlamydophyllum, *Hook. fil. et Wils.*) (No. 122, 1855.)

94. H. *riparium*, Hedw. (No. 110, 1855.)

95. H. *extenuatum*, Brid. (H. crinitum, *Hook. fil. et Wils.*) (No. 9, 125.)

96. H. *paradoxum*, Hook. fil. et Wils. (No. 158, 1855.)

This belongs to the group of species designated by Schimper *Brachythecium*.

97. H. *austrinum*, Hook. fil. et Wils. (No. 15, 1855.)

98. H. *tenuifolium*, Hedw. (H. confertum, var. *majus*, Fl. Nov. Zeland.) (No. 43, 53, 58,—97, 1855.)

99. H. *raphidorhynchum*, C. Mueller. (No. 169, 1855.)

100. H. *laxatum*, Mitten; caule repente laxe cæspitoso vage subpinnatim ramoso, foliis laxis patentibus ovatis margine superne serrulatis nervo tenui medio evanescente, e cellulis laxiusculis areolatis, perichætialibus e basi late ovata lanceolatis integerrimis enerviis, theca in pedunculo brevi suberecta ovali, operculo curvirostrato, peristomio externo dentibus longe subulato-attenuatis.

Hab. Gipps' Land. (No. 115, 120, 1855.)

A yellowish-green Moss, not very much unlike *H. confertum* in size, but its leaves are less acuminate, and composed of cells twice as wide. The teeth of the external peristome have their apices more than usually attenuated.

101. H. *cucullatum*, Mitten; monoicum, caule vage ramoso, foliis

ovatis apice cucullato-inflexis obtusiusculis cymbiformi-concavis margine basi planis ibique cellulis quadratis areolatis, nervo medio evanido, perichætialibus lanceolatis serratis enervibus, theca in pedunculo minute scabro ovali suberecta inclinatave, operculo conico-rostrato, peristomio normali.

HAB. Dargo. (No. 10, 1855.)

Similar to small states of *H. murale*, but its leaves are narrower below the middle, with several rows of quadrate cells at the base on each side of the leaf. The specimens are very poor, but it appears probable that this will be found to belong to the same group as *H. illecebrum* and *H. cæspitosum*.

102. H. *denticulatum*, L.? (No. 59.)

Probably distinct, but too imperfect to be satisfactorily determined.

103. H. *aciculare*, Brid. (No. 60.)

104. H. *comosum*, Labill. (No. 103.)

105. H. *arcuatum*, Hedw. (H. spininervium, *Hook.*) (No. 158, 165.)

106. H. *hastatum*, C. Mueller. (H. furfurosum, *Fl. Nov. Zeland.*) (No. 119,—82 from New Zealand.)

The figure of the leaf in Fl. Nov. Zeland. is taken from those of the ramuli, and very different in form from those of the stem.

9. HYPOPTERYGIOIDEÆ.

107. Cyathophorum *pennatum*, Brid. (No. 39.)

108. Hypopterygium *rotulatum*, Brid. (No. 40, 179.)

109. H. *Smithianum*, Hook. fil. et Wils. (No. 169, 1854,—102, 1855.)

110. H. *pallens*. (Lopidium, *Hook. fil. et Wils.*) (No. 157.)

111. Racopilum *cristatum*, Hook. fil. et Wils. (No. 55.)

10. LEUCOBRYOIDEÆ.

112. Leucobryum *candidum*, Hampe. (No. 116.)

III. SPHAGNACEÆ.

113. Sphagnum *cymbifolium*, Dill. (No. 73.)

HEPATICÆ.

1. Gottschea *Lehmanniana*, Nees. (No. 1.)
2. Plagiochila *fasciculata*, Ldbg. (No. 1, 1852,—7, 18, 162, 1854.)
3. Symphogyna *rhizobola*, Nees. (No. 2.)

4. Fimbriaria *Drummondii*, Tayl. (No. 4, 1852,—131, 1855.)
5. Lophocolea *heterophylloidea*, Nees. (No. 5, 56, 78, 92, 96,—99, 1854.)
6. L. *Austrigena*, Hook. fil. et Tayl. (No. 14.) Jungermannia obtusifolia, *Hook.* (No. 143, 144.) Radula buccinata, *Tayl.* (No. 150, 153.) Frullania falciloba, Tayl. (No. 176, 177.) Jungermannia Starckii, Funk. (No. 198.)
7. Metzgeria *furcata*, Raddi (No. 10, 29, 96, 99,—98, 1855.)
8. Frullania *reptans*, Mitten. (No. 54, 56.)
9. Polyotus *claviger* (Hook.), Gottsche. (No. 84.)
10. P. *Magellanicus*, Gottsche. (No. 111.)
11. Podomitrium *phyllanthus* (Hook.), Mitten. (No. 28, 108.)
12. Mastigobryum *Novæ-Hollandiæ*, Nees. (No. 117.) Intermixed with *Jungermannia monodon*, Taylor.
13. Trichocolea *tomentella*, var. *pluma*, Nees. (No. 126, 1854.)
14. Sarcomitrium *pingue*, Mitten. HAB. "*Blasia*, Mount Cobboras."

Description of New Genera and Species of CEYLON PLANTS; *by* G. H. K. THWAITES, F.L.S., Superintendent of the Royal Gardens at Peradenia. (TABS. VII. and VIII.)

Nov. Gen. I. SCUTINANTHE, *Thw.* Nat. Ord. BURSERACEÆ.

Gen. Char. *Flores* abortu dioici. *Calyx* cupuliformis, carnoso-coriaceus, in segmentis 5 erectis valvatis ad medium divisus, persistens. *Corolla* cum calyce æquilonga; petalis 5, erectis, valvatis, carnoso-coriaceis, persistentibus. *Stamina* 10; *filamentis* in annulum parte inferiori cum disco glanduloso interno et basi calycis corollæque consolidata cohærentibus, apice liberis; *antheris* oblongis, introrsis, dorso affixis, longitudinaliter dehiscentibus. *Ovarium* biloculare, loculis bi-ovulatis; *ovulis* collateralibus, axi affixis, amphitropis, foramine supero. *Stylus* brevissimus. *Stigma* disciforme, medio transverse 1-sulcatum, margine crenulato. *Drupa* carnosa, putamine mediocri, osseo, abortu monospermo. *Semen* exalbuminosum, pendulum, inversum; *testa* membranacea; *cotyledonibus* magnis, foliaceis, integris, cordatis, plicato-rugosis, lateribus reflexis; *radicula* parva, cylindrica. *Flores masculi fœmineique* simillimi; sed in his antheræ effœtæ; in

illis ovarium attenuatum, ovulis effœtis.—Arbor *ingens, Zeylanica;* foliis *impari-pinnatis, exstipulatis;* petiolo *superne sulcato, basi tumido striato;* inflorescentia *axillari, paniculata;* paniculis *multifloris, bracteatis.*

1. Scutinanthe *brunnea,* Thw. (TAB. VIII. *B.*)—C.P. No. 1149 in Herbario Peradeniensi.

Arbor 50–60-pedalis, ramulis foliisque junioribus rufo-tomentosis; *foliis* 10–20 poll. longis; *foliolis* 5–11, oblongis, basi parce obliquis, apice acuminatis, integris, penniveniis, viridi-rufescentibus, 4–8 poll. longis (cum petiolulo 4 lin. longo), 2–3 poll. latis, subtus dense reticulatis, venis prominentibus; *paniculis* flavidis rufo-brunneo-tomentosis; *floribus* 3 lin. latis; *drupis* oblongis, rufo-tomentosis, utrinque attenuatis, 1 poll. longis.

This fine forest-tree, which seems to occur only sparingly in the Central Province at an elevation of from 2000 to 3000 feet, bears a considerable general resemblance to some of the *Meliaceæ,* especially to *Amoora* and *Milnea,* but its nearest affinity appears to be with *Canarium,* from which genus however it differs, as the description will show, in many important particulars. I was at first disposed to look upon the petals and stamens of this new genus as perigynous; but on comparing its flowers with those (especially the male flowers) of *Canarium,* it can scarcely be a matter of doubt that the apparent lower portion of the calyx of *Scutinanthe* consists really of a consolidation of that organ with the bases of the corolla and staminal tube, the whole being lined by the glandular disc. The native name of the tree is "*Mahabooloomora-gass.*"

PLATE VIII. *B.* Fig. 1. Flowering branch of *Scutinanthe brunnea,* Thw. (female tree). 2. Flower from same. 3. The same cut open. 4. Vertical section of ovary. 5. Transverse section of same. 6. Unripe fruit. 7. Longitudinal section of ditto. 8. Transverse section of same. 9. A mature embryo, with testa removed. 10. Longitudinal section of male flower. 11. Stamens from the same:—*all but figs.* 1, 6, 7, *and* 8, *more or less magnified.*

NOV. GEN. II. GLYPTOPETALUM, *Thw.* Nat. Ord. CELASTRACEÆ.

Gen. Char. Calyx parvus, lobis 4, rotundatis. *Corollæ* petala 4, oblonga, obtusa, superne bifoveolata, margine reflexo. *Stamina* 4; *filamentis* erectis, linearibus, in angulis *disci* insertis; *antherarum*

loculis basi divergentibus, ad apicis latera connectivi maximi innati sitis, longitudinaliter dehiscentibus. *Ovarium*, una cum disco circumcingente et adhærente, pyramidato-tetragonum, apice ad *stigma* minutum attenuatum, 4-loculare; *ovula* in loculis singula, pendula, anatropa, raphe extrorsa. *Capsula* 4-sperma vel sæpissime abortu 1–3-sperma, rotundata, loculicide dehiscens, valvis revolutis. *Semina* oblonga, pendula, arillo subcarnoso colorato plus minus obtecta; *testa* membranacea. *Embryo* intra albumen carnosum orthotropus; *cotyledonibus* oblongis, planis, foliaceis; *radicula* brevi.—Arbor *mediocris, Zeylanica;* ramulis *tetragonis;* foliis *oppositis, lanceolatis, penniveniis, serratis;* stipularum *rudimentis;* inflorescentia *cymosa, supra-axillari.*

1. Glyptopetalum *Zeylanicum*, Thw. (TAB. VII. *B.*)—C.P. No. 589 in Herbario Peradeniensi.

Arbor 30–40-pedalis; *foliis* læte-virentibus, 4½–6 poll. longis, 1½–2½ poll. latis, petiolo ¼ poll. longo. *Cymarum* pedunculis 1–1½ poll. longis, pedicellis divaricatis ½ poll. longis; *floribus* albido-virescentibus, 4 lin. latis; *seminibus* ½ poll. longis; *testa* flavo-rufescenti; *arillo* rubro.

This is a well-marked genus, characterized by its peculiar petals, the very large connective to the anthers, the pyramidal form of the combined ovary and glandular disc, and the single pendulous ovule in each loculus: its nearest affinity appears to be with *Euonymus*.

HAB. Not uncommon in the Central Province at an elevation of 2000 to 3000 feet.

PLATE VII. *B.* Fig. 1. Flowering branch of *Glyptopetalum Zeylanicum*, Thw. 2. A flower. 3. Flower with petals removed. 4. Stamen. 5. Longitudinal section of ovary. 6. Transverse section of the same. 7. Immature fruit. 8. Ripe ditto. 9. Section of ripe capsule, showing a perfect seed and an abortive one. 10 and 11. Sections of seed:—*all more or less magnified, with the exception of figs.* 1 *and* 8.

Nov. Gen. III. PRISMATOMERIS, *Thw.* Nat. Ord. RUBIACEÆ; Tribus *Coffeæ.*

Gen. Char. *Calyx* cupuliformis, margine sinuato vel minute dentato. *Corolla* tubo cylindrico; *limbo* 5-partito, segmentis valvatis lanceolatis, carnosis, prismaticis, basi excavatis. *Stamina* 5, inclusa; *filamentis* brevibus; *antheris* linearibus, dorso prope basin affixis. *Ova-*

rium biloculare, loculis uniovulatis; *ovula* pendula, raphe expansa, introrsa. *Stylus* linearis. *Stigma* lobis 2, divergentibus. *Fructus* carnosus, 2-spermus vel abortu 1-spermus. *Semina* hemisphærica, medio excavata; *testa* membranacea. *Embryo* cylindricus, parvus, in dorso albuminis cornei immersus; *cotyledonibus* minutis; *radicula* versus fructus basin spectante.—Frutex *Zeylanicus;* foliis *lanceolatis, penniveniis;* inflorescentia *terminali, fasciculata;* stipulis *interpetiolaribus triangularibus, cuspidatis;* gemmis *gummiferis.*

1. Prismatomeris *albidiflora*, Thw. (Tab. VII. *A.*)—C.P. No. 728 in Herbario Peradeniensi.

Frutex 10–12-pedalis, lævis, ramulis pallidis. *Folia* 2½–6 poll. longa, 1–2¼ poll. lata, petiolo ½ poll. longo. *Fasciculi* 2–4-flori; *floribus* 8 lin. longis, pedicellis 8–10 lin. longis. *Fructus* oblongus, nigro-cærulescens, seminibus 3 lin. diam.

This genus seems to be closely allied to *Ixora*, with which it agrees in habit and general appearance, differing however in its fleshy, prism-shaped, corolla-segments, which are valvate in æstivation, its included stamens, and in the form of its seeds. It is perhaps more nearly allied to *Canthium*. It occurs rather sparingly in the Ambagamowa District of the Central Province.

Plate VII. *A.* Fig. 1. Flowering branch of *Prismatomeris albidiflora*, Thw. 2. Corolla laid open. 3. Stamen. 4. Longitudinal section of ovary, etc. 5. Transverse section of same. 6. Ripe fruit. 7 and 8. Ripe seeds. 9. Longitudinal section of same:—*all but fig.* 1 *magnified.*

Nov. Gen. IV. Dichilanthe, *Thw.* Nat. Ord. Caprifoliaceæ;*
Tribus *Lonicereæ.*

Gen. Char. Calyx tubo elongato, curvato, dimidio inferiore cum ovario connato, superiore libero; limbo 5-partito, segmentis lanceolatis, subæqualibus, reflexis, persistentibus. *Squamulæ* 5, digitatæ vel pectiniformes, calycis tubo paullo intus affixæ, segmentisque alternantes, appressæ. *Corolla* infundibuliformis, calycem multo superans, curvata, bilabiata; labio superiore duobus, inferiore tribus dentibus minutis approximatis terminato. *Stamina* 5, æqualia, inclusa; *filamentis* brevibus, corollæ tubi prope apicem insertis; *antheris* oblongis, dorso prope basin affixis, introrsis, longitudinaliter dehiscen-

* Perhaps referable to *Rubiaceæ.*—Ed.

tibus. *Ovarium* biloculare, loculis uniovulatis; *ovula* ex angulo centrali pendula, anatropa, raphe extrorsa. *Stylus* filiformis, curvatus, corollâ fere duplo longior, in disco magno annulari ovarium coronante insertus. *Stigma* subquadratum, obliquum, apice longitudinaliter fissum. *Fructus* ignotus.—Arbor *mediocris, Zeylanica;* ramulis *teretibus, ad nodos collari interpetiolari gummifluo cinctis;* foliis *oppositis, lanceolatis, acuminatis, integris, penniveniis, nitidis, reticulatis, petiolatis;* petiolo *superne convexo;* floribus *terminalibus, sessilibus, aggregatis.*

1. Dichilanthe *Zeylanica,* Thw. (Tab. VIII. *A.*)—C.P. No. 3422 in Herbario Peradeniensi.

Arbor 30–40-pedalis; *foliis* viridibus vel sæpissime viridi-rufescentibus, 3–7 poll. longis, 1¼–2½ poll. latis; *petiolo* ½ poll. longo; *floribus* 1¼ poll. longis, flavido-purpureis, sericeis.

This very ornamental forest-tree, which seems to differ considerably from any described genus of the *Lonicereæ,* and which is the only indigenous species of the *Caprifoliaceæ* yet found in Ceylon, with the exception of two species of *Viburnum,* which occur in the more elevated parts of the Central Province, grows in small quantity, at an elevation of about 1000 feet, upon some of the forest-covered hills in the district between Galle and Ratnapoora, where I found it in May last, at which time it was in flower.

Plate VIII. *A.* Fig. 1. Flowering branch of *Dichilanthe Zeylanica,* Thw. 2. A flower. 3. Corolla laid open. 4. Stamen. 5. Longitudinal section of calyx and ovary, showing some of the glandular squamulæ at the mouth of the calyx. 6. Transverse section of ovary. 7. Ovule. 8. Stigma:—*all more or less magnified, with the exception of fig.* 1.

Nov. Gen. V. Palenga, *Thw.* Nat. Ord. Euphorbiaceæ. Tribus *Buxeæ.*

Gen. Char. Flores dioici.—Fl. Mas. *Calyx* sepalis 2, concavis, oppositis. *Corolla* 0. *Stamina* 2, sepalis opposita; *filamentis* linearibus, erectis; *antheris* oblongis, extrorsis, longitudinaliter dehiscentibus. *Ovarium* 0.—Fl. Fœm. *Calyx* sepalis 4 (2 externis) vel abortu 3. *Corolla* 0. *Stamina* 0. *Ovarium* oblongum, 2-loculare; loculis 2-ovulatis; *ovula* collateralia, sub placentæ processu magno affixa, anatropa. *Stylus* nullus. *Stigmata* 2, discoidea. *Fructus* oblongus, subcarnosus, putamine crustaceo, abortu monospermo. *Semen* ob-

longum, testa membranacea, hilo laterali, seminis longitudinem fere æquante. *Embryo* in axi albuminis carnosi; *cotyledonibus* oblongis, 7-nerviis; *radicula* cylindrica versus fructus apicem spectante.—Arbor *ingens, Zeylanica;* ramulis *teretibus;* foliis *lævibus, lanceolatis, acuminatis, obliquis, petiolatis, penniveniis, stipulatis, subtus sparsim glanduloso-punctatis;* stipulis *minutis;* floribus *axillaribus, fasciculatis, minutis.*

1. Palenga *Zeylanica*, Thw. (TAB. VII. *C.*)—C.P. No. 3349 in Herbario Peradeniensi.

Arbor 40–50-pedalis; *foliis* nitidis, nigro-viridibus, 3–5 poll. longis, 1–1¾ poll. latis; *petiolo* ruguloso supra sulcato 2 lin. longo; *floribus* albidis ¾ lin. longis; *pedicellis* 1 lin. longis; *fructibus* 8 lin. longis, 4 lin. latis, fusco-tomentosis.

The leaf-buds of this species are coated with a gummy secretion; and the young expanded leaves, when immersed in boiling water, become covered with a thin, waxy exudation.

This species has hitherto only been met with in the Ambagamowa District of the Central Province, and there sparingly, at an elevation of about 2000 feet. The native name of the tree is "*Palenga-gass.*"

The nearest affinity of this genus is evidently with *Putranjiva*, which it resembles very much in its foliage, as well as in general appearance. In the simple structure of its male flowers it approaches the *Scepaceæ*, which group it also resembles, as well as the *Antidesmeæ*, and *Hemicyclia* and *Sphragidia*, amongst the *Buxeæ*, in the arrangement of its placenta and ovules, a peculiarity which seems to bring all the above-named plants within the limits of one Natural Order.

PLATE VII. *C.* Fig. 1, Female flowering branch of *Palenga Zeylanica*, Thw. 2. Young female flower. 3. Vertical section of ovary. 4. Transverse section of ovary. 5. Ripe fruit. 6. Longitudinal section of same. 7. Transverse section of same. 8. Embryo. 9. Male flowers. 10. Male flowers, with sepals removed. 11. Transverse section of male flower:—*all but fig.* 1 *magnified.*

Note on the Genus PROSORUS, Dalzell; *by* G. H. K. THWAITES, Esq.

I find that in my figure and description of "*Prosorus Indica*, Dlzl.," in the sixth volume of this work, p. 298, tab. 10 *C.*, there are mixed

up two distinct though very closely allied species of this genus, but which the possession of more perfect materials now enables me to define satisfactorily. As regards the foliage of the two species, the slightest difference can scarcely be detected, but the following characters, derived from the flowers, show them to be abundantly distinct:—

1. Prosorus *indica*, Dalz., Hook. Journ. of Bot. vol. iv. p. 345; Thw. *loc. cit.* vol. vi. p. 298. t. 10. *C.* fig. 3, 4, 5, 6, C.P. No. 3099, ♂, No. 2155, ♀, in Herbario Peradeniensi.—*Fl. mas.* numerosissimi, 1½ lin. lati; *disco* convexo, gibbo, ruguloso; *pedicellis* 3–4 lin. longis. *Fl. fœm.* terni; *pedicellis* 4–5 lin. longis.

Not uncommon in the southern and central parts of the Island, at no great elevation.—The native name is "*Carrou-gass.*"

2. Prosorus *Gærtneri*, Thw. P. indica, *Thw. loc. cit. fig.* 1, 2, 7, 8, 9, 10. Croton? cyanospermum, *Gærtner, De Fruct. vol.* ii. *p.* 120. *t. C.* 7, C.P. No. 2601 in Herbario Peradeniensi.—*Fl. mas.* numerosi, 3 lin. lati; *disco* concavo, lævi, cum calycis tubo adnato; *pedicellis* 4–5 lin. longis. *Fl. fœm.* solitarii; *pedicellis* 5–8 lin. longis.

This differs from the preceding species in having larger and less numerous flowers and longer pedicels, and in the shape of the glandular disc in the male flowers. It occurs at an elevation of 500 to 1000 feet in the Ambagamowa and Ratnapoora districts.—The native name is "*Sooddoo-leyang-gass.*"

Decades of Fungi; *by the* Rev. M. J. Berkeley, M.A., F.L.S.

Decades LXI.–LXII.

(With Plates V., VI., IX., X.)

Rio Negro Fungi.

(*Continued from p.* 241.)

601. *T. prolifera*, n. s.; albus, subrepens, in ramos cylindricos furcatos fasciculatosque abiens, apicibus matrici disco amplo radiato tandem adnatis. Spruce, n. 17.

Hab. On roots of trees.

White, somewhat creeping, forming cylindrical, forked or sometimes flat, stringy threads, here and there subfasciculate, their tips attached again to the matrix by means of large, orbicular, radiated and laciniated discs.

This species resembles in habit and appearance *T. fastidiosa.* The mode in which the tips of the branches are attached is very singular.

* *Cladoderris dendritica*, P., Freyc. Voy. p. 176. Spruce, n. 81.

HAB. On decaying roots of *Alpinia aromatica.* February, 1853. Panuré.

602. *Stereum hydrophorum*, B.; pileo infundibuliformi fusco umbrino zonato processibus longis amplis planis acute laciniatis dense stipatis concoloribus vestito; stipite rigido tenui subtiliter velutino; hymenio albido. Spruce, n. 80. (Tab. VI.)

HAB. On the ground in high woods on the River Uaupés. Probably attached to concealed branches; also in woods near Rio Negro and Casiquiare. August, 1853.

Pileus 3–4 inches across, infundibuliform, chocolate-brown, coriaceous, repeatedly zoned, velvety, clothed, but more especially in the centre, with a dense forest of flat, branched, acutely laciniated, velvety processes, continuous with the paler substance; edge lobed. Stem $\frac{1}{2}$–1 inch high, attached by a disciform base, round, nearly even, of the same colour as the pileus, obscurely velvety. Hymenium white or very pale umber, smooth.

Nothing can be more curious than the dense mass of processes with which the centre of the pileus is clothed, which, if torn from it, would certainly be described as a new species of branched *Thelephora.* In age the border has but few processes, and in old specimens they appear to be washed away, in which state the species was originally described from specimens communicated by Sir R. Schomburgk. Ann. of Nat. Hist. vol. xiv. p. 327.

* *S. elegans*, Fr. Ep. p. 545. Spruce, n. 174, 13.

HAB. On trunks of trees. March, 1853. Panuré.

* *S. damæcorne*, Fr. Ep. p. 546. Spruce, n. 24.

HAB. On decayed trunks. Panuré.

* *S. reniforme*, Fr. l. c. Spruce, n. 25.

HAB. On the ground.

603. *S. fissum*, n. s.; album; pileo primum spathulato, demum flabellato profunde fisso; stipitibus brevissimis e basi communi membranaceo oriundis; hymenio lævi. Spruce, n. 27.

HAB. On dead twigs. Panuré.

White when recent, ochraceous when dry. Pilei about an inch long, at first spathulate or petaliform, smooth and even or with a few ob-

scure, raised lines, then expanded and flabellate, deeply fissured, nearly to the base. Stems short or obsolete, arising from a common membranous mycelium, which occurs in patches or spreads round the whole branch.

The habit is precisely that of *Cantharellus partitus*, B. No species can be more distinct. Occasionally there is a tendency in the hymenium to become venose, but probably only from contraction in drying.

* *S. lobatum*, Kze. Weig. exs. Spruce, n. 69.

HAB. S. Gabriel, Rio Negro, foot of Mount Cocui.

A very small form.

604. *S. spathulatum*, n. s.; pileo spathulato postice hispidulo, antice glabrescente subtiliter lineato; stipite luteo velutino laterali cum pileo confluente; hymenio pallido subzonato. Spruce, n. 175.

HAB. On wood on the banks of the Rio Negro.

Pileus $\frac{3}{4}$ of an inch long, $\frac{2}{3}$ broad, spathulate or subflabelliform, cuneate below, clothed behind with scattered bristles, which vanish in front, leaving however as their representatives fine raised lines, red-brown, with a pale margin. Stem $\frac{1}{2}$–$\frac{3}{4}$ of an inch high, yellowish, velvety, hispid above, attached by a round disc. Hymenium pale, ochraceous, with one or two dark zones, smooth.

Analogous to *Polyporus luteus*, of which it has very much the appearance.

* *Hypolyssus Montagnei*, Berk. Hook. Lond. Journ. vol. i. p. 139. Spruce, n. 70.

HAB. On dead twigs, etc. Panuré.

605. *Guepinia dilatata*, n. s.; ochracea; pileo spathulato-flabelliformi integro extus granulato tomentoso; margine tenui; stipite elongato. Spruce, n. 82. (Tab. X. fig. 4.)

HAB. On wood. Panuré. February, 1853.

Pileus 2 inches across, broadly flabelliform, gradually tapering below into the flat stem, $1\frac{1}{2}$ inch long; margin very thin, not fissured or divided, upper surface clothed with little granular, pubescent dots.

A fine species, approaching in size *Guepinia Helvelloides*, B.

* *G. fissa*, Berk., Ann. of Nat. Hist. vol. x. p. 383.

HAB. On dead wood. Panuré.

* *Auricularia lobata*, Fr. Ep. p. 555. Spruce, n. 12.

HAB. On dead wood. Panuré.

606. *Clavaria delicia*, n. s.; ochracea, cæspitosa, delicata; stipitibus

brevibus cylindricis e mycelio candido membranaceo oriundis, ramis furcatis hic illic divergentibus, ultimis acutissimis. Spruce, n. 161.

HAB. On dead leaves and twigs. March, 1853. Panuré.

Ochraceous, about half an inch high, forming delicate, tree-like tufts. Stems short, cylindrical, clothed at the base with a little down, and arising from a white, downy, membranous disc, forked two or three times, some of the branches spreading so as to form little tree-like tufts; ultimate ramuli very acute.

An extremely pretty species, with the habit of *C. flaccida*, but approaching in substance the white-branched *Thelephoræ*, though more transparent. At first sight it has somewhat the appearance of *T. dissecta*, Lév., a very differently constructed species.

* *C. furcellata*, Fr. Ep. p. 576. Spruce, n. 154.

HAB. On the ground. Panuré.

* *C. tubulosa*, Fr. l. c. Spruce, n. 158.

HAB. Panuré.

607. *C. cirrhata*, n. s.; cæspitosa, alba, ramosa; ramis suberectis cylindricis, apicibus rectis curvatisque acutis. (Tab. V. fig. 5.)

HAB. On the ground. Mount Cocui.

Two inches high, ochraceous, white, cæspitose, much branched; branches cylindrical, tips straight or curved.

This was first referred as a variety to *Clavaria furcellata*, but this indication is untenable, and I have therefore described it under a distinct name.

608. *C. dealbata*, n. s.; cæspitosa, alba, opaca; stipite brevi tenui cylindrico sursum 5–6-furcato ramis dilatatis, apicibus subuncinatis acutis. Spruce, n. 159.

HAB. On the ground. March, 1853. Panuré.

White, opaque, 2 inches or more high, cæspitose, fastigiate. Stem short, cylindrical, not a line thick, forked five or six times so as to make a tree-like tuft, dilated above, the ultimate divisions somewhat divaricate, the forks below acute, above rounded, ultimate ramuli acute.

A very singular species, remarkable for its white-washed appearance. The branches, except at the extremities, are far broader than the stem, and strongly compressed when dry. Spruce compares this with n. 601, but the two species do not appear to me to have much in common.

609. *C. connata*, n. s.; stipite subelongato e pluribus connato sur-

sum ramoso; ramis hic illic congestis connatisque, apicibus subacutis. Spruce, n. 10.

HAB. On shady ground in woods. Panuré.

Dirty white, 2 inches high. Stem rather long, compounded of many confluent divisions; branches above more free, but here and there dilated and congested, tips rather acute.

This species, on a small scale, has somewhat the habit of *C. macropus*. In all parts however the divisions, instead of being free, have a tendency to coalesce with each other. There is a little white mycelium which binds together the sand.

610. *C. fusco-lilacina*, n. s.; cæspitosa crassiuscula subsimplex fusco-lilacina rugosa, apicibus obtusis. Spruce, n. 152.

HAB. On sandy ground. Panuré.

Tufted, 1½ inch high, rather thick, simple or slightly forked, brownish-lilac, obtuse, rugose, sometimes splitting longitudinally in the middle.

A fine species, remarkable for its lilac tint. It resembles somewhat *Clavaria purpurea*, but is probably tougher when fresh.

* *C. crispula*, Fr. Ep. p. 576. Spruce, n. 160, 162.

HAB. Panuré.

611. *C. Sprucei*, n. s.; alutacea; stipitibus tenuibus glabris è basi contextâ membranaceâ byssoideâ oriundis sursum 3–4-furcatis; ramulis cylindricis substrictis, apicibus obtusis. Spruce, n. 26.

HAB. On decayed trunks and branches. Panuré.

About 1½ inch high, gregarious but not cæspitose, tan-coloured. Stems slender, smooth, springing from a white, membranous, somewhat byssoid expansion, three, or rarely four, times forked; branches erect or only subpatent, cylindrical, tips obtuse.

This resembles somewhat scattered and slightly branched specimens of *Clavaria flaccida*, especially a form of it, which does not grow in pine woods, from which however it is very distinct.

612. *C. Panurensis*, n. s.; aureo-ochracea; stipitibus tenuibus 4–5-furcatis; ramulis erectis hic illic lunatis, ultimis teretibus acutis. Spruce, n. 156.

HAB. On the ground. Panuré.

Bright ochraceous, about 2 inches high. Stems slender, distinct or split almost to the base, forked four or five times; branches erect or only slightly patent, sometimes lunate, ultimate branches elongated, cylindrical, acute, rarely bifid above.

Allied to *C. pratensis* and *muscoides*, but clearly distinct from each other, though most resembling the latter. The spores are probably ochraceous, but I cannot say this certainly.

613. *C. scabra*, n. s.; simplex umbrina acuminata pusilla scabra; basi tuberosa, setis erectis strigosâ. Spruce, n. 157.

HAB. On the ground. Panuré.

About $\frac{1}{3}$ of an inch high, gregarious, subcæspitose, pale umber, simple, erect, acuminate, scabrous with little rough granules; base tuberose, clothed with white or pallid, erect bristles.

This is in many respects like *Calocera tuberosa*, but it appears to be a true *Clavaria*, and is distinguished by its smaller size, scabrous hymenium, and the erect or slightly divergent, not deflexed, bristles at the base.—There is another simple *Clavaria* in the collection, growing on a green substance, which appears to be an anamorphosis of some *Lichen*. The specimens are however too imperfect to afford much information.

* *Exidia protracta*, Lév., Ann. d. Sc. Nat. Oct. 1844, p. 218. Spruce, n. 84.

HAB. On dead wood. Panuré.

* *E. Auricula-Judæ*, Fr. Ep. p. 590. Spruce, n. 18.

HAB. On half-decayed trunks of trees. Panuré.

* *Tremella lutescens*, Fr. Ep. p. 588. Spruce, n. 151.

HAB. On trunks of trees. Panuré.

I cannot distinguish this from pale specimens of *T. lutescens*, such as are figured by Balliard, t. 406, fig. C.

614. *T. fuciformis*, n. s.; alba; cæspitosa, repetiter rotundato-furcata, cum lobis, ultimis exceptis, flabelliformi-dilatata. Spruce, n. 9.

HAB. On trunks of trees. Panuré.

One inch or more high, white, cæspitose, repeatedly lobed or forked, the lobes and main divisions dilated, the base of the forks rounded, the ultimate subdivisions short, cylindrical, obtuse.

Resembling a small specimen of the flabellate and multifid variety of *Chondrus crispus*. It is certainly undescribed.

* *Rhizomorpha corynephora*, Kze. Weig. Exs. Spruce, n. 149.

HAB. Panuré.

It is scarcely necessary to say that this is no autonomous Fungus.

* No. 73 is a curious production on living bark, two or three other forms of which are not unfrequent in South Carolina; they cannot be

Fungi, for their habitat is quite against such a supposition. The probability is that they are anamorphoses of certain Lichens: the truth can probably be ascertained on the spot only where they grow.

* *Cyathus limbatus*, Tul. Ann. d. Sc. 1844. Spruce, n. 148.

Hab. On the half-putrid rhizoma of *Alpinia aromatica*. Panuré. February, 1853.

615. *Scleroderma stellatum*, n. s.; peridio coriaceo demum stellato-reflexo umbrino stellato-verrucoso; sporis umbrino-argillaceis.

Hab. On the ground. Panuré.

About 1 inch across, umber-brown; peridium coriaceous, at length splitting in a stellate manner, rough with minute, stellate warts. Spores argillaceous, tinged with umber, globose, verrucose, $\frac{1}{3500}$ of an inch in diameter.

I know of no *Scleroderma* which at all accords with the present, of which unfortunately only a single specimen was procured.

* *Aschersonia oxyspora*, B., Hook. Journ. vol. vi. p. 205.

Hab. On dead leaves. San Carlos.

Flesh-coloured when fresh. Externally resembling the Khasia specimens. The hymenium is more convolute within, and the spores, instead of $\frac{1}{1666}$, are $\frac{1}{2500}$ of an inch long, differences which are not enough to constitute a distinct species.

616. *Mycogone sphærospora*, n. s.; strato candido; sporis globosis simplicibus fortiter echinatis. Spruce, n. 96.

Hab. On the gills of some Agaric, in woods near the River Uaupés. March, 1853.

Stratum white. Spores globose, $\frac{1}{1500}$ of an inch in diameter, simple, without any trace of a second articulation, rough with strong, rather obtuse spines.

The Agaric on which this mould is developed is said to be pale, with purple spores, but not a trace of the organs of fructification remain, and the species is altogether indeterminable. The spores of the parasite are a beautiful object under the microscope.

617. *Cordyceps bicephala*, n. s.; stipite elongato gracili brunneo apice furcato pulverulento; clavis ellipticis pulverulentis; sporidiis filiformibus.

Hab. Panuré.

Stem 2 inches high, very slender, curved at the base, brown, forked above, and pulverulent; heads elliptic, pulverulent, even. Asci linear. Sporidia very slender, linear.

This curious species, of which I have seen a single specimen only, is almost intermediate between *Cordyceps* and *Xylaria*, the latter of which it approaches in substance. The clavate tip of the inner membrane of the ascus, and the filiform sporidia, indicate an affinity with the more noble species of *Cordyceps*.

* *Xylaria polymorpha*, P., Syn. p. 7. Spruce, n. 141, 142, 144.

HAB. On dead wood. Panuré.

* *X. hyperythra*, Mont., Ann. d. Sc. Nat. Juin, 1840; suberosa pulvere coffeæcolori undique inspersa rimosula; stipite compresso; clavulâ obtusâ ostiolis nigris notatâ. Spruce, n. 143.

HAB. On decayed trunks. Panuré.

Clothed all over with a coffee-coloured bloom, which in some parts is thick, compact, and cracked. Stems 1 inch high, compressed, confluent. Head rather longer, clavæform, obtuse, cracked longitudinally but not deeply; ostiola black. Sporidia elongated, $\frac{1}{1333}$–$\frac{1}{2000}$ of an inch long.

This is apparently n. 376, Leprieur, but in a more perfect state than other specimens which I have seen, and brighter-coloured. The sporidia are for the most part twice as long as in that species.

* *X. dealbata*, B. et C., Journ. Ac. Nat. Sc. Phil. vol. ii. p. 284. Spruce, n. 145.

HAB. On decayed trunks. Panuré.

I have only to add to the description quoted above, that the sporidia are $\frac{1}{833}$ of an inch or more in length, larger perhaps than in any other *Xylaria*, except *X. Clavus*, Fr.

* *X. rhopaloides*, Kze. Weig. Exs. Spruce, n. 76.

HAB. On dead trunks of trees. Panuré.

Exactly the same with n. 236, Leprieur.

618. *X. abnormis*, n. s.; pallida, hic illic ostiolis depressis nigris notata cerebriformis subglobosa nodulosa durissima intus concolor; peritheciis pallidis oblongis crassis; ascis gracilibus; sporidiis minutissimis.

HAB. On dead wood. Panuré.

Subglobose, 1 inch or more across, lobed, irregular, nodulose, resembling in appearance a smooth, white truffle, pale, opaque, very hard, tan-coloured, with a rufous tinge when dry; of the same colour within. Stemless, dotted with little discoloured specks indicative of the ostiola; perithecia oblong, with a short neck, thick-walled, consisting of elongated cells; interstices consisting partly of elongated, partly of

globose tissue, hyaline, though appearing black from the abundant uniserial sporidia, which are subelliptic, $\frac{1}{4500}$ of an inch long.

This species is totally different from anything with which I am acquainted. The pale substance, and absence of all carbonization, seem at first to indicate *Hypocrea* rather than *Xylaria* or *Hypoxylon*. The walls of the perithecia are rather thick, perfectly hyaline, and consist of a finely reticulated tissue.

* *X. Clavus*, Fr., Linn. vol. v. p. 543. Spruce, n.

Hab. On dead bark. Panuré. February, 1853.

The spores of this species attain a length of $\frac{1}{500}$ of an inch.

619. *Cordierites Sprucei*, n. s.; cæspitosa, vinoso-nigra; cupulis obliquis infundibuliformibus; extus stipitibusque tenuibus ramosis scabriusculis. Spruce, n. 85. (Tab. X. fig. 5.)

Hab. On decayed trunks. Panuré.

Tufted, vinous-brown, about $\frac{1}{3}$ inch high. Stems slender, scabrous, branched; cups oblique, funnel-shaped, rather rough externally and slightly venose; sporidia elliptic, $\frac{1}{5000}$ of an inch long.

This is nearly allied to *Peziza concrescens*, Schwein., of which I should have considered it a small form, but for the smaller sporidia and smooth hymenium. The latter character however might not hold good with better and more abundant specimens. I have not seen asci in that species, but they are evident enough in the present.

620. *Thamnomyces fuciformis*, n. s,; stipite crassiusculo filiformi flexuoso, ramulis brevibus rectis thecæformibus regulariter vestito. Spruce, n. 150. (Tab. IX. fig. 3.)

Hab. On decayed trunks. Panuré. February, 1853.

Stem cylindrical, filiform, 1 line thick, flexuous, dark brown, beset everywhere with short, perpendicular branches, about 2 lines long, swelling in the centre, so as to assume the form of the theca of some Moss, and enclosing a single oblongo-elliptic cavity.

This curious species at first sight resembles some seaweed rather than a Fungus.

* *T. rostratus*, Mont., Ann. d. Sc. Nat. Juin, 1840. Spruce, n. 163. Var. *similis*.

Hab. On rotten trunks. Panuré.

Differing in nothing from Dr. Montagne's plant, except in the absence of a beaked ostiolum, a character very variable amongst *Sphæriæ*. It is by Dr. Montagne's advice that I refer the specimens to his species.

(To be continued.)

BOTANICAL INFORMATION.

'*Flora Vectensis.*'

It is with great pleasure we are enabled to announce the appearance, long looked for, of the posthumous work of Dr. Bromfield, the "Flora Vectensis: being a Systematic Description of the Phænogamous or Flowering Plants and Ferns indigenous to the Isle of Wight. London: William Pamplin. 1856." One vol. 8vo, 678 pages, with portrait of the Author and an excellent Map of the Island, prepared expressly for this work. A future notice on our part will explain something of the nature of this very important Flora; and we can only at present say that, though limited to the vegetation of a small island, yet that island is so rich itself, and Dr. Bromfield not only devoted so many years to the preparation of the work, but possessed so much talent for careful discrimination and accuracy of description, that it must ever be considered a standard volume in botanical literature, and from which every European botanist may derive information and instruction.

Bunya-Bunya.

The finest cone of *Bunya-Bunya* (Araucaria Bidwilli, *Hook.*, in Lond. Journ. of Bot. vol. ii. p. 498, tab. xviii. and xix.) that has perhaps ever been sent to Europe, formed part of the collection of the Australian products in the Exposition Universelle at Paris, 1855, and was exhibited by Chas. F. D. Parkinson, Esq., of Moreton Bay, son of Col. Parkinson. Through the medium of Col. J. Sidney North, M.P., this has been presented to the Museum of the Royal Gardens of Kew,* and it is accompanied by the following interesting particulars, from the pen of Mr. Parkinson himself:—

"This tree is deserving of more notice than any other growing in the northern districts of New South Wales; not perhaps because the quality of the wood may be superior to the other kinds of Pine, but because each tree belongs to some one individual of the Aborigines.

"The *Bunya-Bunya* is of the Pine kind, and grows in scrubs, or

* These Gardens, as is well known, possess the first and original tree of this fine *Araucaria*, to which the above name was assigned; and it is now one of the most striking and ornamental trees in the collection, requiring however protection during the winter months.

ranges of hills or mountains. It is not known growing in a wild state further to the south than the range dividing the falls of the waters of the rivers Brisbane and Burnett; but in the Wide Bay District, in the twenty-seventh parallel, it grows very thickly over an extent of country, about thirty miles by twelve, which is in consequence called the '*Bunya-Bunya* country.'

"The tree is easily distinguished, as it far outtops every other kind of tree in the scrub; and instead of the branches pointing downwards as in the Moreton Bay Pine (*Araucaria Cunninghami*), they grow straight out from the tree, or rather with a curve or inclination upwards.

"Its height is immense; Leichhardt mentions their being 160 feet high before there were any branches, for in its wild state the branches only grow near the top of the tree, owing to the want of light in the scrub, but if planted out in an open space they feather quite to the ground.

"The wood can be used for the same purposes as Pine, and is rather more durable: it makes excellent sheep-hurdles. The leaves are of a rich dark green, and sharp-pointed, so much so as to be prickly. The *cone*, or fruit, is very large, and grows on the extreme tip of the tree. This fruit is only plentiful every third year. In appearance it is like an immense Fir cone, and is, before it is quite ripe, of a beautiful green colour. Measurement of the cone sent to the great French Exhibition:—12 inches in length; 22 inches round the broadest part, transversely; 19½ round in the narrowest part. The shape is a depressed globe.

"When the proper season arrives, the natives assemble in great numbers from very great distances all around, for the purpose of eating the fruit, which they generally roast. Each tribe has its own peculiar set of trees, and each family its own allotment among them. These are handed down from generation to generation with the greatest exactness, and if any one is found in a tree not belonging to him, a fight, or 'pullen pullen,' is the inevitable consequence.

"This is believed to be the only hereditary personal property possessed by the Aborigines, and it is therefore generally respected, and this makes the '*Bunya-Bunya*' interesting.

"C. F. D. PARKINSON."

Mexican Botany.

The following is an extract from a Letter of our valued and very obliging friend Henry Christy, Esq., dated Mexico, March 27, 1856.

"I wrote you very hurriedly from Havana on the 6th, and by the same mail you would receive some seeds, etc. I have now been a fortnight in this wonderful country, wonderful alike in its geological as well as its vegetable features. I hope to do something for you among the medicinal plants, some of which are very curious and little known, having had the good fortune to fall in with some of the collectors for the druggists, and also to possess sundry notes of inquiry from my indefatigable cousin, Mr. Hanbury. Should you wish any collection of Mexican plants, there is a German gentleman, a Mr. W. Schaffner,* a druggist, residing at Orizaba, who could do anything in that way. He has already collections for disposal, comprising some 400 Ferns and Lycopodiums, 300 Grasses, etc., and 600 Composite plants. A Mr. Pitts has applied himself to *Cacti*, and has, I hear, a first-rate collection. He might, though not a regular collector, be inclined to make exchanges. Mr. Schaffner would like to make a general collection, and thinks it would take four to five years to go over all this difficult and wide-spread country. Through a druggist here, an Italian of great intelligence, and in relation with all the drug-collectors, a Señor José del Pozzo, any inquiry about any particular medicinal plant could be best made. There are many collectors of Orchids, both in the 'Tierra Templada' as well as the 'Tierra Caliente,' but, so far as I hear, they have chiefly gone to Germany. In the Orchid-house at the princely villa of Don Manuel Escandon, at Tacubaya, the Richmond of Mexico, I saw some very beautiful ones, which Mr. Lettsom, our Chargé d'Affaires, says are new. I am now a beggar for him for some seeds, and I shall be very glad if it is in your power to send them to him, through the Foreign Office, next mail, addressed 'W. G. Lettsom, Esq., H.B.M. Chargé d'Affaires, Mexico.' He wants *Victoria regia* and *Nelumbium cæruleum*. The vegetation here is extraordinary,—most of our fruits, vegetables, and common weeds, mixed with those of a semi-tropical character. Wheat-culture ceases on the mountains between here and Toluca, 9000 feet elevation; the Banana between Cadiva

* From this gentleman we have lately received a very interesting and well preserved Herbarium.—Ed.

and Orizaba, at 2700; wheat commences at Aculcingo, 2900 feet, in the valleys in the eastern slope, where, from the frequent rain, they can have two or more crops. On the wheat-growing plains of the plateau, commencing with the Cañadas of Istapa, 4000 feet, owing to the long drought and but one wet season, only one crop is got; it is sown in June, and reaped in September; the rainy season commences there in June, and extends partially till October. Maize is left out, as in the States, till November, to get dried by the frosts. At Mexico the temperature I find pretty steady to 48° to 50° at sunrise, and 70° to 75° in the shade during the day. The barometers are graduated, not as ours, from 28 to 31, but from 21 and 24; the variation is generally trifling, it is now $22\frac{9}{10}$; water boils at 199°. I hope to get the fall of June from the *Minerea*, the only scientific government offices. The country is in a state bordering on anarchy, and our excursions are much limited. We arrived in the night of a rather severe revolution, which is now, it is hoped, subdued; Puebla, the second city, with 70,000 people, having surrendered. Mexico is still strongly barricaded, as it was feared the rebels would march on the capital. I am now starting for the Real del Monte Mines. The country is said to be very beautiful, and the elevation 1500 feet above Mexico; the climate is like England, so much so that at the table of the Company, I am told by the Hon. Mr. Pakenham, nothing but port-wine is drunk. I go under the wing of two families, who think it best to have an escort of thirty-five men, but I believe that there is no real danger.—H. C."

Collections of Plants *on Sale with* Mr. R. F. Hohenaker, Esslingen, *near* Stuttgart.

1. Prof. Blytt, Pl. Norvegiæ rariores. Sp. 20–100. 3*s*. 5*d*.—17*s*. 2*d*.

2. Dr. Lindeberg, Pl. Alpium Norvegiæ rariores. Sp. 200. £2.

3. Huet du Pavillon, Pl. Siciliæ. Sp. 300. £2. 18*s*. 4*d*.

4. Becker, Pl. rariores Desertorum Wolgæ Inferioris. Sp. 150. £1. 16*s*.

5. Lechler, Pl. Peruanæ. Sp. 60–250. £1.—£4. 3*s*. 7*d*. For a Catalogue of this collection, cfr. 'Berliner Bot. Zeitung,' 1856, 390; Flora, 1856, 271.

6. Schimper, Pl. Abyssinicæ e territorio Agow. Sp. 170–200.

£2. 6*s*. 8*d*.—£2. 14*s*. 10*d*. From a part of Abyssinia, which was hitherto unexplored, and of a character quite different from those known already. Almost all the species have not yet been distributed in Mr. Schimper's collections. A catalogue of them will be found in the German botanical gazettes.

Araucaria imbricata.

Hitherto we believe the original tree of the Chili Pine, introduced by Mr. Menzies from the Voyage of Captain Vancouver, in Kew Gardens, is the only one that has produced cones in this country. We saw a fine cone at Paris last year. Our valued friend, the Very Rev. the Dean of Winchester, informs us that his beautiful tree at Bishop's Stoke, thirty years old and twenty feet high, is now bearing a cone from one of the topmost branches; and further that, at Bicton, the seat of Lady Rolle, one tree is showing cones and another female flowers.

NOTICES OF BOOKS.

Moore, Thomas, F.L.S.: *The* Ferns *of Great Britain and Ireland. Edited by* Dr. John Lindley, Ph.D., F.R.S., etc. Parts XIII.–XVII. (the conclusion). Imp. folio. Nature-printed by Henry Bradbury. London, 1855–6.

It is not one of the least of the merits of this remarkable work, that it has appeared from the press of the spirited publisher, Mr. Bradbury, monthly, with the greatest regularity, and is now brought to a conclusion with the seventeenth number; embracing, not indeed all that are called *Ferns* in the ordinary acceptance of the term, but the true *Polypodiaceæ* and *Hymenophyllaceæ* (or *Trichomanideæ*), which some authors entirely exclude from the Filices veræ, *Osmundaceæ* and *Ophioglossaceæ; omitting Lycopodiaceæ*, *Equisetaceæ*, and *Marsileaceæ;*—which too, it must be confessed, are not well suited to this style of nature-printing.

The 13th Fasciculus of this remarkable work opens with a Plate

(XXXVIII.), well stored with eight figures, representing so many variations in form (of greater or less degree) of *Asplenium marinum;* and nine varieties are recorded. Plate XXXIX. exhibits the well-known *Asplenium Trichomanes*, and certain forms, of which latter nine are here (as in the preceding species) enumerated, accompanied by the remark, "until lately very little variation had been observed in this species; now however several marked varieties are known, and they, for the most part, seem to have the quality of constancy;"—we hope our author does not mean to that degree as to merit being considered distinct species. We have been lately favoured with some specimens of the seventh so-called variety, "from the banks of the Wye, near Monmouth, by Mr. J. D. Enys," *inæquale:* but we must honestly confess we should reckon such to be almost the normal form of the species; so different are the opinions of botanists on Ferns, which every one has the opportunity of studying on our walls and rocks. Plate XL. *Asplenium viride.*

Part XIV. The first Plate here, VII.*, represents the *Polypodium alpestre*, as yet, in Britain, found only on certain highland mountains in Forfar, Aberdeen, and Perthshire. We are glad Mr. Moore abandons his former views of considering *P. flexile* a distinct species, and that he unites it with *P. alpestre.* Plate XLI. includes three somewhat allied species:—viz. 1, our Wall Rue, the well-known *Asplenium Ruta-muraria;* 2, *Asplenium Germanicum*, a very rare inhabitant of the North of England and of Scotland; and 3, *Asplenium septentrionale*, also a rare British plant. Plate XLII. represents *Scolopendrium vulgare*, and its varieties, or rather deformities, to the illustration of which ten folio pages are devoted, and sixty-six varieties are discriminated.

Part XV. Plate XLIII. *A.* exhibits the *Ceterach officinarum*, or "Scale-Fern;" but the figure would hardly justify this latter name:—this process of Nature-printing quite failing in representing the hairs and scales of plants. The thick, woody, and knotted rhizome of this and other Ferns is equally unsuited to this art. At letter *B* of the same plate, the rare *Gymnogramma leptophylla*, being a thin, delicate plant, is most faithfully figured, as is *Blechnum Spicant* (letter *C*), with the exception of the root. Although only the usual form is given, thirteen varieties are described. Plate XLIV. *Pteris aquilina.* Plate XLV. *Adiantum Capillus-Veneris.*

Part XVI. Plate XLVI. represents very good figures of *Cystopteris*

fragilis, *regia*, and *montana* (*alpina* of most authors). Plate XLVII. *Woodsia Ilvensis** and *W. alpina* (*hyperborea* of most authors). These respective figures are so extremely like each other as scarcely to justify Mr. Moore's remark, "No species, one would think, need be more distinct than *W. alpina* is from *Woodsia Ilvensis*." Not a few able botanists find it hard to distinguish them, and it is certain that the extreme forms are not here represented. Deprived of the copious chaffy scales, or exhibiting them only as a faint blur in "nature-printing," the configuration of the two species seems to be identical. Plate XLVIII. *Trichomanes radicans*. These are noble specimens, but apparently entirely destitute of fructification, or if the samples, affording the specimens impressed, possessed it, it is quite obsolete in the figures.

Part XVII. Plate XLIX. *Hymenophyllum Tunbridgense* and *Hymenophyllum unilaterale* (Wilsoni, *Hook.*). Here again we find nature-printing at fault. Distinct as we believe these two species assuredly to be, the figures by no means exhibit the differences. This is in part due to the principal character being microscopic (the entire valves of the involucre); in part also to a peculiar curvature of the apex and pinnæ, in the living plant, admirably described by Mr. Wilson, and as admirably figured by Sowerby in E. Bot. Suppl. t. 2636, but lost in the pressure and flattening of the specimens.

Plate L. *Osmunda regalis*. Plate LI. *Botrychium Lunaria*, *Ophioglossum vulgatum*, and *O. Lusitanicum;* which latter Mr. Moore observes may "fairly be allowed to remain separate from *O. vulgatum*." The author takes no notice of its being already in the late (seventh) edition of the 'British Flora,' considered a mere var. β of *O. vulgatum*, and that not till after a careful examination of the numerous specimens in the Hookerian Herbarium, where "we find all intermediate gradations from the largest and broadest cordate or ovate sterile fronds to a narrow, linear-lanceolate form not half an inch long." Mr. Moore has also carefully examined the same specimens and recorded many of the numerous localities, but comes to an opposite conclusion in regard to

* Custom and want of consideration of the origin of this specific name has permitted its continuance, but *rufidula* (Sw. and Willd.) is infinitely to be preferred. Linnæus called the plant *Acrostichum Ilvense*, believing it to be a plant of Dalechamp, his *Lonchitis aspera Ilvensis* (Ilva, island of Elba!). The geographical and climatic distribution of plants was not much studied in Linnæus's days, or his habitat, given in the 'Species Plantarum,' "in Europæ *frigidissimæ rupibus*," would have thrown a doubt on the identity of the two plants.

specific limits or extension.—The author's Preface is chiefly occupied by an apology or explanation of his "*multitudinous variations*" of the comparatively few species of Ferns inhabiting these islands:—"It will be apparent from the subordinate position assigned to them, that no botanical importance is claimed for most of the forms thus enumerated." Not in general we are satisfied, in Mr. Moore's own view, but it is not so with less instructed minds; and we have ourselves, since the publication of this noble work, received not a few specimens of these variations from young botanists, on which they have laid great stress, but which are totally unworthy any marked attention; and Mr. Moore himself in many instances seems to regret that some of these are not more honoured by botanists in general.

We have however to thank Mr. Bradbury heartily for a work of great beauty and of great artistic interest, and Mr. Moore for the knowledge and care and attention he has devoted to the scientific descriptions and history. We have reason to believe the publication has met with great success, and that it will ere long be found in every library that deserves the name of "botanical."

SCHOTT, H.; ANALECTA BOTANICA: *adjutoribus* C. F. Nyman *et* Th. Kotschy. Part I. 8vo. Vindobonæ, 1854.

This little work contains specific characters, often accompanied by more or less extended remarks, on rather more than one hundred South Austrian or Oriental plants, the greater part of them new species of the authors. How far the plants may be considered deserving to rank as species, we have no means of judging: but that the authors differ in their views from botanists in general, may perhaps be inferred by their motto, from Schmiedel, "Cum satis constet, modestum dissensum neque veritati neque scientiis unquam nocuisse; nemini molestum erit, si ea declaramus, quæ nobis magis probantur, quantumvis ab aliorum placitis recedunt." The characters and notes seem to be carefully drawn up, and probably from living plants in cultivation, though it is not expressly stated that they are so.

Species Plantarum Maderensium *quædam Novæ, vel hactenus ineditæ, breviter descriptæ; auctore* R. T. Lowe, A.M.

1. Berberis *Maderensis*, Lowe.—B. fruticosa spinis tripartitis, foliis simplicibus subspathulatis oblongo-lanceolatis obtusiusculis basi attenuatis subcoriaceis rigidulis reticulatis submarginatis integerrimis, ramulis aurantiacis costatis v. striatis, racemis erecto-patentibus abbreviatis subpaucifloris, floribus globosis.

Hab. In rupibus excelsis convallium Maderæ, ad altitudinem 5000 ped., rariss.

This, the only indigenous Madeiran Barberry, most resembles *B. Cretica*, L., which may however be at once distinguished by its low, dwarfish, stunted, densely prickly habit, thick, short branches, and small leaves.

I revert to my original name of *B. Maderensis* for this plant, discovered by me first in 1838; that of *B. lycioides*, by which I have more lately for some years spoken of it, trenching too closely upon *B. Lycium* of Royle.

2. Cheiranthus *arbuscula*, Lowe.—C. fruticulosus pygmæus dumosus foliosus, caule erecto nano apice capitato-ramoso, ramis abbreviatis plerumque congesto-glomeratis, foliis linearibus apicem versus subdilatatis acutis integerrimis incanis scabris adpresse strigosis, floribus lilacinis, siliquis strictis arcte erectis.

Hab. Abundanter in rupibus montium Pico Branco et P. de Conselho, Portûs Sancti.

Preserves, when cultivated in England, its peculiar, low, stunted habit. Flowers and pods large.

This is the plant erroneously referred to under the name of *Cheiranthus tenuifolius*, Hérit., in '*Primitiæ Faunæ et Floræ Maderæ et Portûs Sancti*,' p. 57, as the favourite haunt of *Helix cheiranthicola*, Lowe. The true *C. tenuifolius*, Hérit., is a perfectly distinct Madeiran species, not found at all in Porto Santo, and very rare or local even in Madeira.

3. Spergularia *fallax*, Lowe.—S. glabra, foliis lineari-subulatis fasciculato-verticillatis muticis obtusis subteretibus basin versus supra planiusculis subcanaliculatis, pedicellis defloratis refractis, sepalis angusto-lanceolatis dorso late herbaceo-viridibus margine albo-scarioso, petalis lanceolatis calycem æquantibus, seminibus globoso-len-

ticularibus seriatim punctatis nitidis atris ala membranacea dilatata radiato-plicata alba cinctis.

HAB. In maritimis Maderæ, Portûs Sancti, Insulæque Desertæ Septentrionalis et Australis.

Facies *Spergulæ arvensis*, L.; sed præter stylos semper tres, capsulam constantissime trivalvem, seminaque late alato-marginata, floribus 6–7-andris fructuque minoribus, sepalis angustioribus, pedicellisque nec pubescentibus nec glandulosis differt.

In several of the characters above enumerated, and smaller size, this much confused or overlooked, and perhaps still questionable species, agrees better with *Spergula pentandra*, L., than with *S. arvensis*, L.; judging of the former not uncontroverted plant by one of Löffling's original specimens (see Smith's E. Flora, ii. 338) preserved in the Banksian Herbarium. It has been sent however under both these names by Bourgeau to Europe. The Banksian Herbarium, for example, contains,—

(1). One whole sheet of Canarian specimens of *Spergularia fallax*, from Bourgeau, labelled "Pl. Canarienses, No. 334, *Spergula arvensis*, L. (Phytogr. Canar. i. 146), Teneriffa, Laguna, 28 Jan. 1845."

(2). Another sheet from the same botanist, marked "Pl. Canar. No. 410, *Spergula pentandra*, L. (Phytogr. Canar. i. 145), Teneriffa, Mesa de Mota, Jan. 1849," is composed of two unquestionable specimens of *Lepigonum fallax*, and two others of a totally different plant, viz. *Spergularia rubra* (*Arenaria rubra*, var. α, L.; *Alsine rubra*, Wahlenb.); a confusion the more singular, because this latter plant has been also sent by Bourgeau to the Banksian Herbarium, correctly named, on another sheet, labelled "Pl. Canar. No. 302, *Alsine rubra*, Wahlenb. (Phytogr. Canar. i. 148), Lancerotta, prope opp. Teguise, 1845."

(3). A third sheet, marked "*Spergula pentandra*, L.," contains, in addition to six small specimens from "Hispania, C. G. Ortega, M.D., 1777," of perhaps true *Spergula pentandra*, having at least a distinctly five-valved capsule,—another undoubted specimen of *Spergularia fallax*, found "In Insulis Canariensibus, Webb."

Thus the plant appears to be diffused throughout the whole Macaronesian archipelago; though hitherto confounded with one or the other of the above old-established species. It differs however from both in its three styles, three-valved capsule, and six to seven stamens; thus belonging to *Spergularia*, Pers. (*Lepigonum*, Fr., Wahlb.; *Alsine*,

Wahlenb.), instead of *Spergula*. In Madeira at least, these and other characters constantly distinguish it from the common *Spergula arvensis*, L.

4. Anthyllis *Lemanniana*, Lowe.—A. caulibus diffusis decumbentibusve adpresse sericeis basi suffrutescentibus, foliis impari-pinnatis, foliolis subdenis elliptico-oblongis subtus sericeo-pilosis inæqualibus infimis minoribus terminali intermediis haud majore, capitulis sæpe duplicatis bracteatis, bracteis ligulatis, calycibus pilosissimis subinflatis oblongis pallide citrinis, corollis lacteis vix subcarneis marcescentibus citrinis apice atro-sanguineis, legumine semiovali monospermo.

Hab. Rariss. in rupibus excelsioribus cacuminibusve Maderæ.

A very distinct and lovely species, with delicate, cream-coloured or pale blush-pink, dark crimson-tipped flowers. Its name is a tribute to the memory of the late Charles Lemann, M.D., an able and accomplished botanist, whose early loss to science has been only through his own peculiar diffidence of character less widely known to be more deeply felt in the circle of his more immediate friends. Having spent the greater portion of the years 1836 and 1837 in Madeira, he had subsequently devoted much time, at my request, to the investigation of various doubtful points connected with its flora; and the present elegant addition to the species of *Anthyllis*, although first discovered by another late regretted friend, P. B. Webb, Esq., of Canarian celebrity, in 1828, was first obtained in imperfect flower by Dr. Charles Lemann in July, 1837, and formed a frequent subject of discussion in our correspondence afterwards. Sufficient materials were still however wanting to establish perfectly the species till I rediscovered it in 1847, and subsequently for several successive years, in favourable condition for complete investigation.

5. Medicago *calcar*, Lowe.—M. piloso-pubescens subvillosa, caulibus prostratis elongatis gracilibus tenuibus rigidulis, stipulis lanceolatis parce et subremote fimbriato-laceris v. setaceo-incisis, foliolis obovatis apice argute serratis inferioribus retusis, pedunculis 1–5- (plerumque 2–3-) floris folia subsuperantibus v. æquantibus, leguminibus glaberrimis cochleatis 3–4-cyclis subinermibus vel biserialiter parce breviterque calcaratis oblique subvenosis nec reticulatis nec lacunosis.

Var. α; pedunculis folia subsuperantibus, leguminibus rugulosis margine spinis rectis conico-abbreviatis armato.

Var. β; pedunculis folio subæquantibus, leguminibus lævibus inermibus vel subinermibus.

HAB. In Portûs Sancti apricis.

I first discovered this plant in 1828, but remained unable to establish its claims to specific distinction till last year (April, May, 1855), when I again met with it in two or three localities plentifully, during a month's thorough re-examination of the whole island, in company with Mr. Wollaston. It has been sent by Bourgeau from Grand Canaria to the Banksian Herbarium (Pl. Canar. No. 768), labelled "*M. tribuloides*, Desrouss." It is very distinct from *M. tribuloides*, Lam., and appears to be hitherto undescribed.

6. Melilotus *Lippoldiana*, Lowe.—M. caule erecto, foliolis rotundato-obovatis suborbicularibus abbreviato-cuneatis latiusculis, summis angustioribus oblongo-obovatis, argute erosulo-denticulatis, stipulis angustis lineari-acuminatis setaceo-productis, floribus majusculis laxe racemosis distincte pedicellatis, corolla calycem duplo excedente, carina vexillum æquante, alis brevioribus, calyce subbilabiato dentibus duobus superioribus approximatis, leguminibus ovatis rostratis carinato-marginatis subconfertim flexuose arcuato-costatis v. subcorrugato-plicatis.

HAB. In Maderæ apricis maritimis.

An old, imperfect specimen of this plant exists in the Banksian Herbarium, ticketed by Dr. Solander, "Trifolium Melilotus italica, Linn. Sp. Pl. 1078, Madera." It is however perfectly distinct from the plant to which that synonym is usually considered to belong; and *M. parviflora*, Desf., is the species to which it more approximates; from this however it is easily distinguished by the rounded, broad or shortly ovate leaflets, the more lax racemes, the larger and distinctly stalked, instead of nearly sessile flowers, and the keeled or margined, beaked, and ovate, somewhat densely arcuato-plicate pods. The name commemorates a German horticultural botanist, Dr. Lippold, who resided a year or two in Madeira nearly twenty years ago, and who first called my attention more particularly to this plant, as differing more than varietally from the common *M. parviflora* and *sulcata*, Desf.

Ord. LEGUMINOSÆ.

TRIB. LOTEÆ.

Gen. PEDROSIA, *Lowe.*—*Calyx* campanulatus, quinquefidus, laciniis

tubo longioribus. *Corolla* carina rostrata vexillum alasque excedente. *Stamina* diadelpha, $\frac{1}{9}$. *Stigma capitatum; stylus rectus, subtus dente subulato producto fissus. Legumen lomentaceum,* lineare, rectum, cylindraceum, *isthmis sæpissime strangulato-moniliforme torulosum, septis inter semina transversis pluriloculare.*—Plantæ *plerumque maritimæ* Macaronesianæ *sc.* Maderenses *aut* Canarienses, *prostrato-fruticulosæ, humiles, microphyllæ, argenteæ v. glaucescentes;* floribus *citrinis luteis aurantiacisve sæpe atro-purpurascentibus.*—Nomen ferat in honorem J. A. Pedroso, Insulam Portum Sanctum plantis plurimis foris introductis tam usu quam ornatu præstantibus (e. g. *Tamarix anglica?* Webb, et *Mesembryanthemum edule,* L.) locupletantis, a suis æque ac ab alienis botanophilis ob egregiam humanitatem plantarumque studiositatem optime merentis.

* *Flores solitarii, axillares.*

7. Pedrosia *Porto-sanctana,* Lowe.—P. sericeo-argentea suffrutescens, caulibus diffuso-prostratis v. humifusis adscendentibus, stipulis foliolisque lineari-lanceolatis, floribus solitariis axillaribus sessilibus, calycibus amplis persistentibus villosis, leguminibus calyce vix longioribus villosis tereti-moniliformibus articulis globosis.

HAB. In rupestribus maritimis Portûs Sancti vulgatiss.

Flores inter folia latentes subinconspicui sat vero magni atro-purpurei sc. carina citrino-virescente alis vexilloque nigris. *Legumina* parva, 2–6-sperma, calyce fere inclusa.

Discovered first in 1828, but omitted in my 'Primitiæ' and 'Novitiæ,' from uncertainty regarding some of its essential characters.

8. Pedrosia *argentea,* Lowe.—P. sericeo-argentea hirsuta, caulibus diffuso-prostratis elongatis adscendentibus rigidis lignosis frutescentibus, stipulis breviter petiolulatis foliolis ovali-rotundatis, foliis petiolatis foliolis obcordato- v. obovato-cuneatis retusis nervo sæpe excurrente mucronulatis, floribus solitariis (rarissime binis) subsessilibus, leguminibus distincte pedicellatis longis rectis cylindricis hirto-subpuberulis 12–50-spermis.

HAB. In cacumine montis Pico de Facho Portûs Sancti, et in Insulis Desertis.

Differs strikingly from *Pedrosia macrantha* (*Lotus macranthus,* Novit. 546) in its much larger leaflets, clothed like the whole plant with long, close, silky hairs, and in its stouter, more robust, and woody habit.

Flowers dark lurid-purple. Pods 1–2 inches long, as many-celled as seeded.

** *Flores subumbellati.*

9. Pedrosia *florida*, Lowe.—P. fruticulosa sericeo-albicans foliolosa, foliolis confertis parvulis lanceolatis v. obovato-lanceolatis acutis stipulisque conformibus omnino sessilibus, umbellis 2–5-floris, leguminibus rectis cylindricis glabris.

Var. α; fl. læte aurantiacis.

Var. β; fl. pallide sulphureo-stramineis.

HAB. In Portu Sancto.

Differs from *P.* (*Lotus*) *glauca*, Ait., in its more silky, hoary foliage, lanceolate acute leaflets, larger, more numerous flowers, often four or five in a head, and larger, thicker, straighter, and even, instead of strangulato-torulose, pods.

10. Astragalus *Solandri*, Lowe.—A. herbacea annua villoso-pubescens, caulibus prostrato-adscendentibus diffusis, foliolis multijugis ovalibus v. oblongo-ellipticis retusiusculis superne glabris inferne hirto-canescentibus, pedunculis elongatis folio longioribus multifloris, pedicellis fructiferis deflexis, leguminibus pendulis falcatis compressis dorso late canaliculatis acutis adpresse strigoso-pubescentibus.

Astragalus canescens, Sol. MSS. in Herbar. Banks. nec DC.

HAB. In Portu Sancto vulgatissimus.

The compressed, trigonal, widely channelled, and in all stages adpresso-pubescent pods, not to mention other points of difference, seem to distinguish this common, and certainly indigenous Porto-Santan *Astragalus*, from *A. hamosus*, L., and I therefore yield at length to the great authority of Dr. Solander, who, as I ascertained more than twenty-five years ago, had made it a distinct species. From *A. falciformis* v. *falcatus*, Desf., on the other hand, it differs in its hairiness and annual root, though resembling that species greatly in the pods and general habit.

Although in strictness Dr. Solander's MS. designation of this plant is not superseded by *A. canescens* of De Candolle, that species having merged into a synonym of *A. onobrychoides*, Bieb., it would be now undesirable to adopt a name having no real claim to preference, and liable to cause confusion.

Ord. Umbelliferæ.

Subord. *ORTHOSPERMEÆ.*

** *Umbellis compositis seu perfectis; vittis in fructu variis, rarissime nullis.*—DC. Prodr. iv. 57.

†† Multijugatæ, *nempe jugis primariis et secundariis notatæ.*—Ib. 58, 199.

Trib. THAPSIEÆ, *Ib.* 58, 202.

Gen. Monizia, *Lowe.*—*Flores* . . . *Fructus* a dorso plano-compressus, 14-costatus, costis (præsertim 4 lateralibus marginalibus) crassis fungoso-suberosis obtusis rotundatis inermibus, 10 dorsalibus (intermediis) minoribus, 4 lateralibus (marginantibus) magnis. *Mericarpia* jugis primariis 5, 3 intermediis crassiusculis subfungoso-suberosis dorso, 2 lateralibus v. potius ventralibus tenuibus (vix filiformibus) simplicibus nec fungosis plano commissurali impositis; secundariis 4 fungoso-suberosis crassis obtusis, 2 interioribus minoribus tenuiusculis, 2 exterioribus marginantibus maximis latis obtusissimis; vittis sub jugis secundariis 4 dorsalibus, 2 commissuralibus latissimis; carpophoro bipartito. *Semen* complanatum.—*Herba* basi frutescens, caudice simplici abbreviato obeso crasso lignoso subarboreo, caule florifero annuo terminali erecto-ramoso, foliis æqualiter et concinne decomposito-pinnatisectis, segmentis rigidiusculis lucidis glabris, petiolis late vaginantibus velutinis. *Umbellæ* compositæ multiradiatæ, bracteis bracteolisque (involucris involucellisque) polyphyllis integris. *Flores* albi.

Named after Senhor J. M. Moniz, an ardent botanist and successful investigator of the native Flora of Madeira, and a no less zealous horticulturist, always actively engaged in introducing new or rare plants into the island, and in promoting the spread of agricultural and horticultural knowledge amongst his countrymen.

11. Monizia *edulis*, Lowe.

Hab. In rupibus excelsis maritimis Insulæ Desertæ Magnæ.

This fine Umbelliferous plant, remarkable for its large and elegant, varnished, fern-like foliage, approaches nearest to *Melanoselinum decipiens*, Hoffm., of Madeira, both in botanical characters and habit. The woody stem is however much shorter, thicker, and obese, instead of tall and cylindric, and the finely-divided foliage is very different and peculiar, the broadly-triangular leaves resembling fronds of *Balantium Culcita* (Sw.), Klfs. The long, curved, horn-like subdivisions of the

sparingly-branched root are eaten either boiled or raw. They are outwardly black, internally white and subfarinaceous, and being eagerly sought after for food by the fishermen and Orchil-gatherers resorting to the Great Dezerta, when prevented by bad weather from procuring better provisions from Madeira, there is reason to apprehend that the plant will soon become extirpated. Already it is rare; and it was only in one place that I succeeded in obtaining a distinct sight of it, growing out of fissures, or on ledges, far down the face of the perpendicular cliff, 1200 or 1500 feet high, which forms the eastern sea-wall of the Great Dezerta, 200 feet or more below the edge. It can only be gathered by expert cragsmen, let down by ropes from the top of the lofty cliff-barriers which gird the island. It appears to flower early in the spring. In June the flowers were all over, and the seeds nearly or quite ripe. The unboiled root tastes like the tuber of *Bunium denudatum*, DC.; when boiled it appeared stringy and insipid, like a bad parsnip. It is much more dry, hard, and fibrous, than a carrot. The Portuguese however on the spot call it Rock Carrot, "Cenoula da Rocha."

12. Chrysanthemum *hæmatomma*, Lowe.—C. fruticosum glabrum parce ramosum, foliis succulentis rigidiusculis crassiusculis bipinnatifidis, pinnis inæqualiter inciso-dentatis basi utrinque 3–5-pectinato-dentatis, floribus subsolitariis paucisve (2–3) terminalibus in corymbum amplum digestis, anthodiis crassis carnosis, radio pallide roseo v. carneo, disco atro-sanguineo mox conico-convexo.

Hab. In rupibus maritimis Insularum Desertarum illius præsertim Australis Bugio dictæ.

A genuine *Chrysanthemum* of De Candolle's sixth Group, *Magarsa*, notwithstanding the remarkably convex disc of the receptacle, which becomes hollow and more conical as the seeds ripen. Nothing can exceed the beauty of this fine plant as seen by Mr. Wollaston and myself early in June, 1855, on its native rocks of the Bugio, with its masses of large pink flowers, varying from full rose to the faintest blush or almost pure white, visible a long way off on the high perpendicular barren cliffs towards the summit of the island. Even the white-flowered state is at once distinguishable from its nearest allies, *C. pinnatifidum*, Linn. fil., and *C. dissectum*, Lowe (Novit. p. 17 or 539), of Madeira, by the dark blood-coloured florets of the disc, without recourse to the other characters of the leaves and habit.

13. Centaurea *Massoniana*, Lowe.—C. inermis, caule fruticoso erecto prolifero-ramoso, ramis subcorymbosis superne (novellis) albo-tomentosis foliosis, foliis lanceolatis utrinque acuminatis integerrimis rigidiusculo-membranaceis subfurfuraceo-scabriusculis nudis v. ad nervum marginemque solummodo tomentosulis l. floccosis, basi in petiolum longe attenuatis, capitulis terminalibus solitariis longe pedunculatis majusculis conico-globosis glabris, pedunculis nudis subfurfuraceo-puberulis sulcatis sursum incrassatis sub anthodio tumidis, anthodii squamis integerrimis oblongis latiusculis apice breviter palmato-setulosis innocuis haud pungentibus internis purpurascentibus, omnibus limbo nitidissimo glaberrimo lævi marginatis.

C. salicifolia, Sol. MSS. "Madera, Fr. Masson, 1776," Herb. Banks. No. 81! non Bieb. (DC. vi. 571, No. 27.)

"*C. salicifolia*. C. calycibus palmato-subspinosis innocuis, foliis lanceolatis acutis integerrimis subglabris petiolatis.

"Hab. In Madera inter rupes Pico do Ranxo, Fr. Masson." Sol. MSS. in Herb. Banks.

It is surprising that this fine *Centaurea*, discovered by Masson eighty years ago, and preserved in both the Banksian and Smithian Herbaria, has remained till now unpublished, although recognized and well defined by Dr. Solander in his MSS. as distinct from every other known species. Since 1838, when I first received from the late Dr. Charles Lemann an account of the existence of this plant in the above-mentioned Herbaria, I have repeatedly visited the supposed place of its growth, indicated by Masson, viz. the Pico do Rancho, a lofty crag or cliff overhanging the sea, five or six miles to the westward of Funchal, beyond Camera de Lobos, but in vain; and all inquiries and researches elsewhere in the island, on the supposition that some other Pico do Rancho might have been Masson's original habitat, have hitherto proved equally unsuccessful. It is fortunate that the specimens preserved in the above-named collections are fine, and in excellent condition, wanting nothing but the florets and seeds, which have perished or been lost.

The plant belongs however clearly to the thirteenth Section, *Cheirolophus*, Cass., in De Candolle (Prodr. vi. 577), of *Centaurea*; and hence it will also probably, when the florets and seeds are known, be found to come under the genus *Ptosimopappus* of Boissier. The anthodia are larger than in *C. sempervirens*, L., but with their upper or inner scales from 6–10-fimbriate at the apex, as in that species.

Notwithstanding Solander's apposite name of *salicifolia*, the leaves have rather the aspect and texture of those of an *Epilobium* than a *Salix*.

14. Musschia? *Wollastoni*, Lowe.—M.? herbacea hirtiusculo-pubescens, caule succulento basi suffrutescente apice folioso, foliis (1–2-pedalibus) oblongo-lanceolatis acutis deorsum longe attenuatis sessilibus argute et concinne duplicato-serratis membranaceis nervis præsertim pubescentibus medio subsucculento subtus hirsuto, paniculæ elatæ multifloræ pyramidatæ ramis divaricato-patentibus, floribus cernuis, calycis sinubus simplicibus exappendiculatis tubo prismatico 5-angulari 10-costato laciniis erectis oblongo-lanceolatis acuminatis tubo duplo longioribus, corolla lateritio-ochracea velutino-pubescente cylindrico-tubulosa laciniis angustis linearibus canaliculato-cornutis.

HAB. In adytis umbrosis convallium Maderæ rariss.

Herba macrophylla, perennis. *Caules* crassitie digiti, fere simplices, panicula e medio foliorum terminali bipedali erecta. *Folia* flaccido-membranacea 1–2-pedalia 2–6-poll. supra medium lata læte viridia sæpe pulchre purpurascentia. *Flores* magni, 1½–2-poll. longi. *Corolla* colore fere *Canarinæ Campanulæ*, L., v. *Isoplexidis Sceptri*, L., sc. ochracea v. aurantio-gilva lateritio v. ferrugineo-purpurascente picta, tubo tenui angusto sepalis subbreviore laciniis eadem superantibus. *Stigmata* 5, semipollicaria, magna, conspicua, exserta, stylo tubum corollæ superante. *Filamenta* omnino libera glabra tenuissima, basi membranacea dilatata, antheris rectis linearibus distincte cuspidatis sublongiora. *Ovarium* 5-loculare: capsula . . .

The mode of dehiscence in the ripe capsule will determine whether this highly curious and rare Campanulaceous plant be really a second species of the Madeiran genus *Musschia*. Otherwise, it will be found probably to form a new genus, *Codocnemia* or *Codonemia;* for besides that it ill accords in habit and various other respects with *Campanula*, it will range under neither of the two great divisions, *Medium* and *Eucodon*, of that genus; differing from *Medium* in the exappendiculate sinuses of its calyx, and from *Eucodon* in its quinquelocular ovary, so that, if placed in *Campanula*, it would require the formation of a third division of the genus, *sinu calycis non obtecto, capsula 5-loculari*, for its reception. And again, though approaching *Symphyandra*, DC. fil., in its ochraceous velvety corolla, it differs generically in its five long stigmas and quinquelocular ovary. Thus *Musschia* remains in fact the only

genus to which at present it can be referred with least disturbance and most probability; though sufficient difference, it must be confessed, exists to throw considerable doubt upon this collocation. I hope however to receive this autumn from Madeira specimens in a condition to decide the question.

I first met with two or three plants of *M.? Wollastoni*, June 22, 1847, in a moist dripping rocky hollow along the Levada in the Ribeira da Metade, just beginning to shoot, and each with already a fine terminal crown of leaves; but being unable to return to the spot that summer, and too easily or indolently resting afterwards on a hasty fancy of its being merely some rank luxuriant or monstrous state, due to its peculiar locality, of seedling *Isoplexis Sceptrum*, L., two of the leaves, preserved in my herbarium, recorded all my knowledge of the plant till the spring of 1855, when Senhor J. M. Moniz showed me imperfect specimens, with similar leaves, in his collection, procured from a countryman, which he very rightly judged not to belong to the *Isoplexis*. The conclusion from these data, that a new Madeiran plant remained still to be established, was shortly substantiated to our mutual satisfaction. Towards the end of August we were plentifully supplied by the same countryman, employed by Senhor Moniz for the purpose, with broken portions of a panicle just bursting into flower, gathered on "rocks a little below the Boca das Torrinhas, in the Boa Ventura." And living plants, I am informed this summer, have already reached England.

I am particularly happy to connect the name of the author of that noble work, the 'Insecta Maderensia,' with so fine a plant, befitting in some sort his special claims as a Madeiran naturalist.

15. Bystropogon *piperitus*, Lowe.—B. foliis ovatis crenatis mollibus utrinque cum petiolis ramulisque floriferis brevissime velutinis absque nitore obsoletissime sparsimque rari-punctatis subeveniis, cymis pedunculatis corymbosis abbreviatis, dentibus calycinis ovatis obtusiusculis tubo valde brevioribus.

Hab. In rupibus Maderæ.

Folia minuscula ½–1 poll. longa membranacea subtenuia flaccido-flexilia nec rigido-fragilia, odore *Menthæ piperitæ*, L.

Habit and flowers of its nearest ally, *B. punctatus*, Hérit., but very distinct by its soft, veinless, finely-velvety, instead of strongly-veined, stiffish or rigid, and above smooth and shining, leaves, besides their

peculiar peppermint-like fragrance. I have only met with the plant in the Curral das Freiras, where it is however scarcely less common on dry rocks and banks in several places than the universal *B. punctatus*, Hérit.

16. Juncus *lucidus*, Hochst., Seub. Fl. Azor. p. 24, No. 147*, t. iv. f. 1.—J. dense cæspitosus rigidiusculo-tenacissimus, culmo tenui compressiusculo nudo tenuiter striato basi folioso, foliis angustis linearibus canaliculatis culmos subæquantibus, bracteis 3–4 foliiformibus tenuibus duabus valde elongatis anthelam multo superantibus, anthela terminali composita ramulis erectis cymosis intus floriferis s. floribus secundis lucidis subimbricatis, sepalis subæqualibus angusto-lanceolatis attenuato-acuminatis trinerviis capsulam globoso-ovatam subabbreviatam apiculatam distincte superantibus.

Hab. In humidiusculis umbrosis Maderæ.

A little known but seemingly distinct species, much resembling *J. compressus*, Jacq., to which indeed I had referred it before the acquisition of Seubert's 'Flora Azorica.' It is not uncommon in many places in the north of Madeira, delighting to grow in roads or paths in damp, shady places amongst the chestnut-woods, forming tufts with thickly-matted, not at all creeping, excessively tough roots, and numerous slender, rigid, upright stems from 6 to 12 inches high.

17. Luzula *Seuberti*, Lowe.—L. anthela supradecomposita multiflora subsecunda nutante involucrum superante, floribus badiis sparsis distinctis nec congesto-glomeratis, pedunculis 1–4-floris sæpius sub-unifloris, bracteis perigoniique glumis membranaceo-scariosis eximie paleaceis anguste lanceolatis subaristato-acuminatis basi nervoque medio castaneis margine utrinque pallidis capsulam abbreviatam subgloboso-ovatam apiculatam duplo superantibus, filamentis brevissimis, seminibus minutis ovalibus simplicibus ecristatis, foliis latis nervoso-striatis longe acuminatis planis margine villoso-ciliato nivoso-pilosissimo subtomentoso integerrimis lævibus, culmo foliisque elatis 1–2-pedalibus, radice perenni tenaci cæspitosa stolonifera.

Hab. In salebrosis rupestribus umbrosis Maderæ, rariss.

Luzula Canariensis, No. 503 of Bourgeau's Canarian plants in the Banksian Herbarium, from Teneriffe, approaches Seubert's *L. purpureo-splendens*, Seub. Fl. Azor. p. 24, t. iv. f. 2, precisely in the points in which it differs from the present Madeiran plant, viz. the more agglomerate or congested flowers, and the shorter, not aristato-acuminate,

sepals. It differs however from both in the paler silvery, instead of purple or chestnut, hue of the panicle. In its larger size and habit it agrees better with the Madeiran than with the Azorian plant.

L. Seuberti therefore is characterized, and may be distinguished from both the above-named plants, by the more distinct or separate and scattered flowers, and the large, deep chestnut-coloured, filmy or chaffy, long and narrow, aristato-acuminate sepals, differing further from *L. purpureo-splendens*, Seub., in its altogether larger size and longer, broader, smooth and flat-edged leaves. For the present, therefore, it is better to record it as distinct, though it is possible that fuller acquaintance with the Canarian and Azorean plants may prove all the three to be mere forms or varieties of a single species. It is remarkable however that the Canarian plant in some respects approaches nearer to the Azorean than to the Madeiran, or at least that the Madeiran plant is not entirely in characters, as it is in geographical position, intermediate between the other two.

Ord. GRAMINEÆ.

TRIB. HORDEACEÆ (*Kth.*), *Koch.*

Gen. ARTHROCHORTUS, *Lowe.*—*Spiculæ* solitariæ, multifloræ, excavationibus *spicæ nodoso-articulatæ rectæ* immersæ, rhachi (ut in *Lolio*) contrariæ. *Gluma* univalvis, cartilaginea, concavo-linearis, *spiculam obtegens* eamque includens. *Palea* inferior cartilaginea, *sæpe sub apice aristata;* superior membranacea, mutica.

18. Arthrochortus *loliaceus*, Lowe.

HAB. In Insula Deserta Septentrionali Ilheo Chão dicta.

Gramen annuum lucidum glabrum læte-virens habitu *Lepturi* (*Rottbœlliæ*) *incurvati*, L., radice fibrosa, culmis pluribus 6–18-pollicaribus decumbentibus undique diffuso-procumbentibus v. prostrato-adscendentibus ramosis nodosis geniculosis foliosis in spicas attenuato-elongatas nudas crebri-nodoso-articulatas rigidas rectas nec flexuosas mox subincurvas demum ad nodos facile diffractas imo fragillimas productis. *Folia* flaccida latiuscula plana scabra raro lævia, culmis superne vaginisque scabriusculis tumidiusculis stipulis abbreviato-truncatis. *Spicæ* longe productæ graciliusculæ caudatæ quodammodo stoloniformes apice demum acutæ subpungentes. *Spiculæ* 6–8-floræ scabræ, gluma lineari-oblonga internodia sæpissime æquante concava rhachi arctissime adnata scabra omnino inclusæ, rachidio articulato

fragillimo scabro. *Palea* inferior flosculorum superiorum sub apice breviter aristata, paleam superiorem muticam arcte involvens, utraque scabra marginibus dense ciliolatis.

On first discovering, early in June, 1850, a few plants of this Grass growing sparingly along the low, central, rocky ridge at the top of the little Northern or Flat Dezerta, I hastily assumed it to be some state or form of *Lolium temulentum*, L. Revisiting the island with Mr. Wollaston in 1855 again at the same season, I found, immediately on landing, its whole surface sprinkled plentifully with a Grass which, forgetting my former discovery, I at once conjectured on the spot to be some species of *Rottbœllia* or *Lepturus*. On closer subsequent examination and comparison, however, my two plants not only proved to be precisely identical, but could be referred neither to *Lolium*, *Lepturus*, or *Rottbœllia*, nor indeed to any other hitherto constituted genus; and, in fact, the plant was altogether new. The foregoing account will serve to indicate its natural affinities and intermediate rank between *Lolium* and *Lepturus*, close to the latter, from which it is at once distinguished by its many-flowered, partly awned spikelets.

I cannot conclude this Paper without warmly acknowledging my obligations to Robert Brown and J. J. Bennett, Esq., for affording me every possible facility and kind assistance at the Banksian Herbarium with reference to the plants described in it.

On the Transplantation of the PERUVIAN BARK-TREE *into* Dutch East India; *by* DR. DE VRIESE.*

Were this notice intended for the learned world alone, it would be necessary to treat the subject more amply than is now attempted, as nothing more is desired than to enable the inquiring reader to understand what Quinquina is, its value to mankind, and the views that have actuated the Dutch in what they have done in this important matter.

On some points of a scientific nature it has been necessary to be more diffuse than in other respects was desirable, as the greater part of the uninitiated (and who would misinterpret this term?) are not

* Extracted from a Work entitled 'De Kina-Boom uit Zuid-America overgebragt naar Java. Door W. H. De Vriese. 'S Gravenhage. (Translated by James Perrin, Professor of the English Language at Leyden.) 1855.'

generally acquainted with the specialities of natural and medical science; in other respects, conciseness has been necessary to avoid too great amplification.

From the earliest scientific information we know that the inhabitants of South America have done nothing to hinder the unlimited collection, we should almost say robbery, of the Quinquina woods. No one thinks of their cultivation, and the Public Authority seems not to be interested in it, or is not able to be so: the latter, we should be disposed to conclude, when we consider, after Weddell, that the Quinquina district covers an extent of 2000 square miles.

We notice also that unheard-of quantities are exported; nay, what is more, now and then whole woods are burnt up. It may be unknown to the Peruvians and Bolivians less than to Europeans, that the quantity diminishes, and that the trees, which are felled by thousands, are not so speedily succeeded by others, that replace them. Whoever descends the Andes, to visit the woods in which the Quinquina grows, finds his way from the sound of the reckless axe of the Cascarilleros, as they mercilessly, in an unexampled manner, hew these beautiful trees. This rough handling is not alone working fatally for the future, but all accounts are unanimous that an incredible quantity of bark is lost in the most reckless manner.

These circumstances have the sad consequence, which De la Condamine foresaw as probable, and that all late travellers confirm, namely that there is a visible diminution in the quantity of Quinquina trees.

Don Antonio de Ulloa,* thirty years after De la Condamine, uttered a warning against the destruction of the Quinquina woods, and proposed that strong prohibitive measures should be taken against their abuse. This, although very late, sixty-six years after, the Government of Bolivia considered, viz. in January, 1838; it issued an order against the exportation of Quinquina wood for five years.

Pereira† makes the remark, that as these trees are produced but in one quarter of the world, and no care is taken of their cultivation, it is nowise to be wondered at that this bark, in the course of time, should disappear from commerce.

* Writer of 'Noticias Americanas,' vol. i. 1772, 8vo. See also Hooker's 'Companion to the Botanical Magazine,' i. 247.

† 'The Elements of Materia Medica and Therapeutics,' by J. Pereira, ed. 3, vol. ii. part 2, pp. 1605 *et seq.* London, 1853.

Stevenson* declares that if the Government of America do not take care to preserve the Quinquina-tree, either by forbidding the felling of it, or by obliging the authorities of the provinces to take strong measures to prevent the destruction of the tree, it is much to be feared that this excellent production of the New World will be wholly exhausted.

Weddell, in the Introduction to his 'Histoire Naturelle des Quinquinas,' says that his attention has been given to all sorts of Quinquinas. These are his words:—"L'immense accroissement pris par le commerce des Quinquinas dans ces parties, rendait en quelque sorte nécessaire un travail à leur sujet. A une époque aussi où la consommation de ces écorces, ét surtout de leur principe fébrifuge, la Quinine, devient de plus en plus considérable, je crois qu'il peut être utile d'appeler l'attention sur les écorces qui un jour devront remplacer la Quinquina Calysaya, dont l'épuisement devient de plus en plus imminent. Ces espèces, si elles sont beaucoup moins riches en principes actifs, nous offrent encore, par leur abondance, quelque sécurité contre la chance prochaine de nous voir privés du médicament le plus précieux du règne végétal."

Several Dutch naturalists, whose zeal in the advancement of science for the good of mankind and the glory of their country is above all praise, have, for more than twenty-five years, urged upon the Government, both at home and in India, the transplantation of the Quinquina-tree from South America to Java. Those gentlemen have been Messrs. Blume, Korthals, Reinwardt, G. J. Mulder, Miquel, Fromberg, Vrolik, and others.

It will be superfluous to say that successive Ministers for the Colonies have considered these propositions, and all who were officially called to it, and could throw light on the subject, have shown their interest in, and their desire for, the accomplishment of this object.

Some of these naturalists have thought it probable that after some years, if the Quinquina-tree should be exhausted in South America, the culture of it might succeed in Java. Others have thought that neither pains nor money should be spared to transplant from Peru to Java a tree which would grow as luxuriantly there as in America.

The desirableness of the transplanting was continually kept in remembrance; but the Government supposed the thing impracticable.

* Narrative of Twenty Years' Residence in South America, ii. 60.

The wish to obtain seeds of this tree, through the Dutch consuls in different States of America, was disappointed, the difficulty of obtaining them being so great, on account of the distance of their stations from the woods of the interior of Peru, Bolivia, and New Granada. Seeds and plants were often promised by one and another, but these promises were not realized, although they were continually renewed. It was sufficiently clear that the only means to obtain seeds or plants of the Quinquina-tree was to send thither a proper person to fetch them.

To find such a person was not easy. Various knowledge, botanical knowledge, and particularly an acquaintance with the Quinquina, were required. A great constancy and intrepidity in danger and in the difficulties of long journeys in foreign countries, and especially a strong constitution, would be requisite in one charged with so important a mission.

Meanwhile the experience and information obtained by Mr. Weddell, in South America, were not lost to the naturalists of the Netherlands. His fame, but particularly his excellent writings, as well as the barks and dried specimens, collected by him in Peru, were not only known and appreciated here, but came freely into the possession of Dutchmen, and of their scientific institutions. In the Museum of Paris they were submitted to the inspection and research of the professional and interested with a praiseworthy liberality, of which the writer of this communication was able to bear witness during his sojourn in the French capital.

In the month of June, 1852, the Minister for the Colonies proposed to the King, that a proper person should be sent to South America, to collect seeds and plants, and to transport them directly to Java, and he was empowered to despatch Mr. Justus Charles Hasskarl, late Botanist of the Botanical Gardens at Buitenzorg, Java, on the mission.

The choice of so competent a man may in all respects be considered fortunate. Mr. Hasskarl, by a long residence on the Island of Java, had become accustomed to the influences of a tropical climate. He had a strong constitution, and was of middle age. For many years he had given evidence of a great love for the science, and a comprehensive knowledge of the Flora of Java. His numerous published writings evince great accuracy, perseverance, and industry. His travels and investigations in India had furnished him with an uncommon measure

of experience in travelling, particularly in overcoming the difficulties which so often arise out of the nature of a tropical soil.

From his sound judgment and caution there was every reason to believe him particularly fit for this mission; it is not to be wondered at, then, that he immediately attracted the Minister's attention who proposed him to the King for this important service. Expectation was not disappointed, as the result has shown, for the object of Mr. Hasskarl's mission to South America has been attained.

A plan was prepared and proposed, though he was left to his own judgment and prudence, and was only charged not to confine himself to the Calisaya Quinquina plant, but to collect as many as possible of the other sorts of Quinquina, which are found at various heights above the level of the sea. He was to go from Southampton to Chagres, and so on over Panama to Guayaquil and Loxa, whence he was to journey inland. To save time, preference was given to the steam-voyage to Panama, above the longer one of doubling Cape Horn, which would have caused a delay of three months at least before the traveller could reach the places from which he would have to direct his course towards the interior of South America.

On the 4th of December, 1852, Mr. Hasskarl left the Netherlands for Southampton, which he quitted on the 17th of December, on board the steamboat La Plata, arriving at St. Thomas on the 1st of January, 1853; on the 12th, at Aspinwall, by Chagres; and at Panama on the 14th, just three days too late to continue his voyage by the steamboat that touches at the ports on the west coast of South America.

Being thus detained, he on the 25th continued his route to Payta, to go thence to Guayaquil. With the knowledge however that the rainy season would render his journey fruitless, he changed his plan and went to Lima.

In the beginning of May he ascended the first, and then the second Cordilleras, thence he descended into the lower part of Peru. Here it was that he saw, for the first time since leaving Panama, a luxuriant vegetation, but which however was far from being comparable with that of the last-mentioned country.

To what difficulties such journeys are subject, may be generally known from the accounts of travellers in the pursuit of natural history; but it may not be uninteresting to the reader to be informed of Mr. Hasskarl's experience in that respect.

The roads over the mountains of Peru are bad, mostly not broader than a bridle-path, and there are often on one side deep and dangerous precipices; it is impossible for travellers meeting to pass each other. When the crest of the second Cordilleras is passed, the traveller finds steps rather than roads. Here the way must be traversed on foot, the baggage being borne by Indians, if one is so fortunate as to find any. Setting forth on foot by Vitoc to Monohamba and Uchahamba, Mr. Hasskarl had the satisfaction to see the first Quinine-trees in their natural state, although these were not the Calisaya Quinquina, which are found in Southern Peru and Bolivia. Returning from Monohamba, across the second Cordilleras, he went to the capital of the province of Zanja.

Near Uchuhamba Mr. Hasskarl saw a great number of true Calisaya Quinquina-trees, but he was only able to collect a few of the plants and seeds. Of that good sort he collected a large quantity of seed, besides about fifty plants, which, after being packed with much difficulty, were sent from Lima to Holland on the 28th of July, 1853. This packet contained, besides seeds of "*Calisaya*," four packets of "*Cinchona ovata*," and a small quantity of "*Cinchona pubescens*." In a letter to the Minister for the Colonies, dated 12th August, Mr. Hasskarl sent a small bladder of seeds of the "*Cinchona amygdalifolia*." After a voyage of about a month and a half, these objects arrived in a good state at Lima. They were addressed to some one acquainted with their culture, and by him packed in Wardian cases, and despatched to Panama. Owing to a misunderstanding of the carrier, they were detained there; and when, after experiencing the influence of a tropical heat, on arriving at Lima, all were dead. Here we had to lament the loss of the soil in which those plants were set in the cases, which, if it had been chemically examined in this country or in India, might have thrown some light on the culture. However the seeds arrived safely, and were consigned to the Directors of the Botanical Gardens of the Universities, and at Amsterdam. We shall revert to these seeds later. From Uchuhamba the traveller went more southerly, where the people, who had revolted against the Government, and declared themselves free, not unfrequently threatened his life, for they looked upon him as a spy of the Peruvian Government. Often, and that too in the night, wholly and suddenly forsaken by his guides, was he obliged to wander about, without the most necessary food, to seek his old track, being whole days without seeing a human being.

The opinion that the Quinquina-trees are found together in woods, growing, as it were, in company, is again, by the experience of Mr. Hasskarl, refuted. They are often scattered, and sometimes, even in the Quinquina districts, very difficult to find. Can the contradiction which, in these statements, exists between the earlier and present writers, be explained by the destruction of the woods, which has taken place during the last half century?

Arrived in the province of Caraboya, he cherished the hope that he should there find the Quinquina-trees still full of fruit and seed, and *that* from information given him. This hope was disappointed, as the seeds were already scattered.

In the latter end of September, 1853, Mr. Hasskarl arrived at Cuzco, the old Inca town. Passing from there to Sandia, the capital of the district of that name, where alone the Quinquina, as far as Peru is concerned, is collected, he put himself in connection with some old and experienced bark collectors (*Cascarilleros practicos*), to obtain information, and to make inquiry concerning the places where the Quinquina-trees grow. Thus he was enabled to see a great number and variety of the Quinquina species, but it was his misfortune to discover that he had come too late to collect seeds, for the fruits remaining on the trees had already dropped their seeds. It may not be improper to remark here that the Quinquina seed is extremely fine and light, and surrounded by an exquisitely fine membrane, so that it is easily blown away and lost, but also, that to this cause may be traced the wonderful extent of the Quinquina-trees in South America.

It was even less possible at that time to obtain young plants of those trees. In Caraboya however the trees were very scarce, much scattered, and thus rare, as the Cascarilleros had grubbed up all the old or seed-bearing trees. It is therefore often necessary to cross the great river, and thus to go over the boundary of the country of the wild Indians, with a faint hope of success, to look for these trees, and to find scattered here and there in the woods, young plants that have grown up from seeds.

In this manner, being disappointed in his expectation that his journey would be finished with 1853, he determined to return to Lima, and pass the rainy season there till April; however he changed this place, where, in the meantime, the yellow fever had broken out in a severe form, for Chili, where a cooler climate seemed to promise the

restoration of his impaired health and strength. Advices from the Netherlands induced him to settle at Arequipa, where he was expecting to receive news of a score of Wardian cases, which he bought at Lima, being forwarded to Islay. Having received this advice, he determined to go to a distance of 150 Spanish leagues into the interior, to make further investigations.

A series of difficulties however presented themselves, which rendered the obtaining of Calisaya plants almost impossible. Peru and Bolivia were at war with each other. In the former year, the frontiers of the latter were wholly forbidden to the Peruvians. Mr. Hasskarl however believed that the restraint had been removed, with the exception of a small port on the "*desaguadero*" (outlet), lying at the south corner of the Lake Titicaca, which favourable change might have been brought about by the departure of the Peruvian armies, under the command of Echinique, to reduce Arequipa, where the insurgents had ranged themselves under the banners of Castilla.

Bolivia was the country to which his attention was particularly directed, for there, according to the information, right or wrong, he had received, the Quinquina-trees were not so widely spread, but in certain places, called "*manchos*," appear in great numbers, and grow much higher. If he might be fortunate enough to penetrate into the more deeply situated districts of Bolivia, the chance of collecting seeds and plants was not unfavourable, as the Calisaya of Bolivia, which is collected here, is the Quinine Bark *par excellence*.

The frontiers of Bolivia were soon reached. Mr. Hasskarl was soon at La Paz, not far from the snow-mountain at Lutchis, a Bolivian frontier village, where he learned that the military order, forbidding the passage of the frontier, had not been revoked, as he had been erroneously informed.

He was thus obliged to determine to retire on the Peruvian territory, which he did, with the plan of going to Sandia in an easterly direction, keeping along the Bolivian frontier. With what pains and difficulties this expedition was attended can scarcely be conceived, unless we gave the detailed account furnished by himself, which our present space forbids. At the frontier places of Peru are often found Bolivians, who are generally Cascarilleros. For these the passage of the boundary was not forbidden, as it was for the Peruvians. They carry on their trade, have their families and abodes in Bolivia; they export all sorts

of objects or produce, and were not only disposed to serve Mr. Hasskarl, but they afforded all wished-for help, so that he was (naturally for an equivalent) very quickly supplied with plants by some, with seeds by others. Awaiting these, he went from one frontier place to another, and at last reached the above-mentioned Sandia, which he determined to make his head-quarters, and to which the objects to be delivered were to be forwarded at an appointed time, that he might pack them. He determined also to visit the places deeper inland himself, and to study, as much as possible, the Quinquina Calisaya.

Meanwhile, the agreement with the Bolivians for plants and seeds of Quinquina-trees, for which provisions and strong drinks were given to those people, to load their mules and to serve as barter, was fulfilled, and by this means he really succeeded. While Mr. Hasskarl was gone from Sandia eastwards, one of the Bolivians arrived with a very considerable number of plants. Having received information of this, he returned speedily to Sandia to secure all, that the plants might not suffer from the air and heat. On arriving, he found about 400 Calisaya plants, although not all of the strength for which he had agreed. The person who brought them must have had a very difficult journey to arrive at Sandia with this precious cargo.

We shall not here enumerate the difficulties and dangers with which Mr. Hasskarl and that precious burden had to contend before he had accomplished a distance of 150 leagues, to bring those objects in a safe state to a place of shipment. The necessary means were contrived and put in action to obtain the seeds promised, but in this he was not able to succeed. The person who had undertaken to secure them, and to follow him on his arrival at Sandia, to Arequipa and Islay, and for which sufficient travelling expenses were allowed, did not come; at the same time, the interest that was felt in keeping the plants alive did not admit of delay.

In the packing of the plants several circumstances required attention; first, the plants were to be made sufficiently damp to be able to reach the coast without drying up, notwithstanding the strong drying winds, and the almost perpendicular rays of the sun. Particularly was it necessary to protect them against this last, against the great warmth during the day; while on the other, it was equally necessary to guard these precious objects against the other extreme, the cold of the evenings and nights, which on those mountains is sufficiently severe.

Just in the months from June till August, the water on the high table-lands (particularly at night) is frozen to ice. If it had been the aim of the indefatigable traveller to transport the plants set in *earth*, the weight, and the consequently increased number of beasts of burden, would have caused more hindrances; the plants themselves, but particularly their roots, would certainly have been injured by the continual shaking of the animals. It was also necessary, in other points of view, to provide for the plants in such manner that they should not have to suffer; considering that large plants were difficult to preserve from the injurious external influences before mentioned. The sprigs were closely packed together, with the roots in damp moss; each packet was wrapped in the bark of Pisang stalks, and fastened with sackcloth, and made into small bales, somewhat resembling wool-bales, as those in which goods are forwarded on the llamas from the interior to the coast. The Pisang stalks necessary for this packing had to be fetched from the lowlands, on the shoulders of Indians; the moss, which did not grow at Sandia, was obtained in the mountain districts; all which, on account of the awkwardness and laziness of the Indians, cost much pains, time, and money.

But with the greatest difficulty was the necessary rope obtained. Four persons were sent into the lower woodlands to collect bark, and work it up so as to serve for rope. Strong cords were required to bind the packages on the beasts of burden; these were ordered at Cruzero, and in this Mr. Hasskarl met with cordial co-operation. The collecting of so many mules in this solitary and out-of-the-way place was no slight matter: they were weak animals that could not carry half the weight the mules of Arequipa were able to bear on their backs.

After a legion of difficulties of divers kinds, too many and too various to sum up here, the expedition started from Sandia on the 8th of June.

It seemed however as if the diffiulties would never come to an end. The animals were driven forward as fast as possible, but it was necessary, for the sake of the plants, to shorten the way as much as it could be. From early in the morning till late in the evening they travelled on, almost without interruption, to leave the hill-country, with its extreme changes of temperature, behind, and to get as far off the highway as possible, that the cavalcade might incur no risk from the numbers of troops, who took possession of all transports as contraband of war, and that the plants, which were threatened with many dangers from that cause, might arrive in safety.

Arrived at Azangora, they learned that no beasts of burden were to be obtained, as they were all required by the insurgents belonging to the party of Castilla, to carry muskets brought from Bolivia to Cuzco; whereas other drivers had taken the district of the mountains, to avoid being compelled to a like service for the corps of General Roman, who was on the way from Puno to Cuzco. It appears that the strife of the two Republics against each other, and the troubled condition of the contending parties, caused the indefatigable and courageous traveller many difficulties, and almost occasioned the failure of his mission.

We will not now follow him in the enumeration of his disasters, but only say that, not counting five days when he was detained by meeting with the soldiers, he, by means of forced marches, accomplished the journey from Sandia to Arequipa in a week; thence, embarking on a ship ready for sea, he went by Islay to Callao, and thence direct to Java.

(*To be continued.*)

BOTANICAL INFORMATION.

The late Professor Bojer.

The scientific world, and particularly the lovers of Eastern botany, will learn with regret the death of Professor Wenceslaus Bojer, which took place at Port Louis, Mauritius, on the 4th of last June. For the last thirty years, the student of exotic botany has been familiar with his name; the 'Botanical Magazine' of Sir W. J. Hooker, and the 'Prodromus' of the late Professor De Candolle, attest the value of his scientific researches, and show the extent and variety of the beautiful trees and plants which he was the first to introduce to the notice of European botanists. The writer of the present sketch has laboured with Professor Bojer in the Royal Society of Arts and Sciences, Mauritius, for several years, and the following account of his travels and researches in countries at that time but little known and frequented, he has heard from M. Bojer's own lips.

M. Bojer was born at Prague, in Bohemia, on the 1st of January, 1800. Remarkable from early youth for the love of botany and natural science, he was noticed by the late Emperor of Austria, who consi-

derately paid for his education, and that of three other young men, destined at a future period for missions of scientific discovery, and particularly with a view to botanical research in foreign countries. In the year 1820 M. Bojer reached Mauritius, in company with the well-known naturalist, Hilsenberg. After having visited several districts of the island of Madagascar, making extensive collections of plants and seeds of all kinds, most of which were entirely new to the botanists of Europe, M. Bojer, as one of the first-fruits of his labours, sent a very extensive herbarium of rare specimens to the Vienna Museum, and was afterwards rewarded by the Emperor with a pension, and the decoration of the Order of Merit. At the instigation of Sir Charles Colville, then Governor of Mauritius, M. Bojer made a second voyage to Madagascar, and after botanically exploring its western shores, he crossed over to the eastern coast of Africa, visiting in succession Pemba, Monbaza, and Zanzibar, where he collected many new plants, most of them of extraordinary beauty. He then visited the Comoro Islands and Agalega, and the rich herbarium he brought from these spots laid the foundation of his well-known work, the 'Hortus Mauritianus.' He remained about six years in these different places, though principally residing in Madagascar, where he was intimate with King Radama, who was really a civilized Prince in the midst of barbarism, and who appreciated scientific men, particularly the English and French, thus forming a strong contrast to his usurping successor, Queen Ranavala Manjaca. The writer of this notice has often heard Professor Bojer speak in rapture of the infinitely diversified and luxuriant vegetation and botanical beauty, as well as the salubrity, of the interior of this vast island, which, on the gradually ascending heights, 300 miles inwards, forms such a striking difference to the unhealthy and miasmatic borders of the seacoast. He often regretted that the English, whom he regarded as his adopted countrymen, did not take some steps for settling in the interior of the island, so rich in mineral and vegetable wealth, and which afforded so magnificent a field for the purposes of emigration.

In the year 1837 M. Bojer published, by subscription, his 'Hortus Mauritianus,' which is well known to European botanists, and which is an enumeration of the exotic and indigenous plants growing in the island, arranged according to the Natural Orders. The value of this work is great, from the scrupulous attention given to the localities of plants, and from its pointing out the most favourable spots for the cul-

tivation of introduced species, as well as from the fact that it collects into a single volume succinct descriptions, the *résumé* of a vast number of observations scattered through a variety of treatises and volumes. It was the intention of M. Bojer to publish a supplement to the 'Hortus,' in order to specify, in botanical detail, the characters of new genera and species which he had introduced and established, superadding to this a List of the Agamous plants of the island. This necessary work was never completed; so little encouragement was given to science in the Colony, and the Government seemed to appreciate so slightly the labours of a true votary of scientific botany, that M. Bojer has told the writer of this sketch "that he had not heart to continue now what once would have been to him a labour of love." A large portion of this supplement is still in manuscript.

M. Bojer introduced into Mauritius many beautiful and valuable exotics, too numerous however to be mentioned here. We must name however that splendid tropical tree of Madagascar, the *Poinciana regia*, called by the French "Flamboyant," from its gorgeous, flame-like flowers, and which characteristic epithet is simply the translation of the Malgashe term for the tree, "Voulatzara;" the *Stachychrysum pterospermum*, from the interior of Madagascar; the *Colvillea racemosa*, from the western coast of the same island, a very splendid tree, with a charming raceme of blossoms, named after the Governor of Mauritius; the *Agathophyllum aromaticum*, the most fragrant of all the spice tribe, the fruit of which, about the size of a plum, is of a delicious fragrance, and as the tree flowers and fruits rarely, though it grows perfectly well in Mauritius, this circumstance causes it to be much sought after for the sake of that most *recherché* of all French liqueurs, the "Crème de Ravensara," the Malgashe name of the tree; the *Guilandina Bonduc*, and various other creepers; the *Achyranthes aspera*, from the Comoro Islands; the *Plumbago juncea*, from the Bay of St. Augustin, Madagascar; the *Scævola Koenigii* (the "Veloutier Blanc" of the French); a new species of *Vangueria*, *V. edulis;* and many other species, too numerous to find a place in this brief sketch. When the writer of this notice left Mauritius, M. Bojer was engaged upon a monograph of the *Mangifera* tribe, and which he intended to publish with beautifully coloured, life-size plates, to the number of eighty varieties, the publication of which, in Europe, was to have been confided to the superintendence of the writer of the present notice. His friends in Mauritius

are now thinking of fulfilling Professor Bojer's wishes in this respect, if sufficient subscriptions can be collected for the purpose.

But it was not as a botanist only that M. Bojer was remarkable; he was also an excellent chemist and geologist, as well as a scientific entomologist; and the Colony of Mauritius has benefited by his labours in each of these departments during a period of thirty-six years. With M. Louis Bouton, Charles Telfair, and that celebrated lover and protector of science, M. Jules Desjardins, he founded, in 1830, the first organized scientific institution in the Colony, "The Society of Natural History," which, in 1845, had its title changed to that which it now bears, "The Royal Society of Arts and Sciences, Mauritius." When M. Desjardins died, his widow, with a high appreciation of science, presented the fine museum of this truly great man to the Colony, and recommended M. Bojer to the Government as the fittest person to be the Curator of this museum, a situation he continued to hold till his death, though most inadequately paid. From year to year M. Bojer, as Curator and Vice-President of the Society, and M. Louis Bouton, as Secretary, laboured together with constant zeal and devotion to keep up the light of science in the Colony, and to communicate to the learned societies of Europe the results of their interesting studies. About a year ago M. Bojer was appointed Professor of Natural History and Chemistry at the Royal College of Port Louis, where, for the first time, so important a chair as that of natural science was established, though the College had been the principal educational institution of the Colony, since the taking of the island by the English in 1810. The salary for this professorship also was most inadequate, and quite unworthy of the constant and zealous labours of M. Bojer, for so many years, in the service of the Colony. His last work,—in the preparation of which he no doubt laid the seeds of his fatal malady, from continued exposure in the cane-fields for several weeks,—was an elaborate and excellent memoir on the "Borer Insect," which had committed such ravages in the island. Several capital engravings represent the insect in all its metamorphoses, and M. Bojer determined it as a new species of *Lepidoptera*, naming it "*Proceras sacchariphagus.*"*

At the beginning of June, when Mauritius was just recovering from a severe visitation of the cholera, from which M. Bojer had fortunately

* The insect is doubtless the well-known species, *Diatræa sacchari* of the Rev. Mr. Guilding.

escaped, the disease known to medical men under the name of "Barbiers," and which is often so fatal in Ceylon, made its appearance in the island. M. Bojer was seized by it, and gradually sank under the attacks of this slow paralysis, and expired at noon, on Wednesday, the 4th of June, in the fifty-sixth year of his age, retaining his complete consciousness until a few minutes before his death. M. Bojer was a member of many learned societies in England, France, and Germany; and in private life was highly esteemed for the simplicity of his manners, the readiness with which he put himself at the head of any inquiry which could be useful to the colony he had adopted as his home, and for the pleasure he seemed to feel in being able to afford information to every one, from the vast stores of his accumulated knowledge. His friend and fellow-labourer, M. Louis Bouton, pronounced a touching oration at his grave, which was surrounded by a numerous and sorrowing concourse, who had come to pay the last tribute of respect to a truly worthy man, and who deeply felt the great loss the Colony had sustained. M. Louis Bouton justly observed, "Pleine et entière justice peut-être n'a pas été rendue de son vivant à cette haute et puissante capacité, à ce savoir profond, qui eût pu briller d'un éclat si vif à Londres, à Paris, à Vienne, à Berlin."

Fortunately for Mauritius M. Louis Bouton remains, to continue the labours of his scientific and departed friend. He is indeed one of the few men of science in the Colony; one who has laboured in its interests with so much zeal and such disinterestedness for so many years. Mauritius owes the Secretary of the Natural History Society a debt of gratitude which it should be happy in having had at length the opportunity of repaying in some slight degree, by conferring spontaneously upon him the appointments so worthily filled by M. Bojer. Trifling though the salary may be which is attached to them, no other person should be placed in that scientific position but M. Bouton, for he was one of its most energetic originators, for many years the right-hand of M. Bojer; and in the opinion of the writer of this notice, who knows well the scientific workings of the Colony, he is the only man capable of doing justice either to the Museum or to the Professorship of Natural History. A first-rate botanist, with a mind richly stored with all the scientific knowledge of the age, a Creole of the Colony, speaking the English and French languages equally well; in constant communication with the scientific men of Europe; he at least, who has kept up the

flame of science in the Colony under so much discouragement, and with so much disinterestedness, should now receive from the hands of the Colonial Government the fitting acknowledgment of his past labours. He alone should be placed in that situation where he could honour his deceased friend, by carrying out his scientific views, and where he could be of service to his country, by stimulating the youth of the Colony to imitate M. Bojer in that which made him great, a persevering pursuit of science, and a constant desire to improve himself in every kind of knowledge, and, by so improving himself, to be in a condition to raise and ameliorate the position of all around him. J. M.

The Soap-Plant *of California.*

We have received bulbs of a Liliaceous plant, remarkable for their elongated form, including their coating (and this coating of a remarkably fibrous character), under the name of *Soap-plant:* firstly, from China, sent by our excellent friend Sir John Bowring, in 1855; and, secondly, in 1856, specimens of a *Soap-plant*, and these in flower, from California, through Messrs. Veitch, of the Exeter and Chelsea Nurseries, sent by their collector, Mr. William Lobb. Happily, by means of these latter we are able to determine the plant, and it is thus seen that the Chinese plant and that of California are one and the same: and it is not a little remarkable, that, though a plant of little or no beauty, originating in a country (viz. California) whence comparatively few plants are yet common in our gardens, and although not yet known to authors as possessing any remarkable properties, I find that no less than four good figures of it can be confidently referred to.

1. The first in point of date of publication is in 1816, in Redouté's 'Liliacées,' tab. 564, where it appears under the name of *Scilla pomeridiana*, De Cand. (Cat. Monsp. 143). It had flowered in the Jardin des Plantes at Paris, but its native country was unknown to the author. It had been sent to Professor De Candolle by a cultivator at Bordeaux, for *Phalangium bicolor*, "qui est toute autre plante." The fibrous coats of the bulb, though *described*, are not here accurately represented.

2. In 1821 the plant was in the Nursery of Messrs. Colvill, King's Road, Chelsea, where it flowered in the greenhouse, and was figured by Mr. Gawler in the 'Botanical Register,' tab. 564, as *Anthericum pome-*

ridianum, a name Mr. Gawler had previously applied to it in Brande's 'Journal of Science and the Arts,' i. 181;—quoting however *Scilla pomeridiana* of De Candolle and Redouté: but stating nothing of its introduction, nor of its native country, further than that "the native place does not seem to have been ascertained;" and "we suspect the plant to be of the same species with a dilapidated sample from the Cape of Good Hope, preserved in the Banksian Herbarium under the title *Anthericum scabrum*."

3. In 1834, at the late Mrs. Marryat's, flowered at Wimbledon, a bulb which had been collected during the recent surveying voyage of her nephew, Captain (now Sir Edward) Belcher, R.N.; "but she was uncertain where he collected it." This Mr. D. Don rightly referred to the *Scilla pomeridiana*, De Cand. (Anthericum, *Gawl.*), and published it in Sweet's Brit. Fl. Gard. ser. 2, t. 381, under the name of *Phalangium pomeridianum;* but could offer no suggestions as to its native country or property. On these we can throw a little light, for our friend Mr. J. Smith, Curator at the Royal Gardens of Kew, remembers well the receiving a letter from Mr. Barclay, the Kew Collector, during the voyage just alluded to, in which he mentioned among the remarkable plants of California the "*bulb of the Soap-plant:*" and we may here remark, that probably but for this quality the bulbs of a plant, possessing so little claim to beauty in the flowers, would never have been sent to Europe at all.

4. The fourth and last notice of this plant to which we have specially to refer, is that of Dr. Lindley, who gives a specific character, and remarks upon what he supposes a new Californian plant, in Bot. Register, 1841, Misc. p. 53, n. 111, under the name *Ornithogalum* (Chlorogalum) *divaricatum.* The bulbs were sent by N. B. Hindes, Esq., Surgeon on board H.M.S. 'Sulphur,' collected during a voyage in the Pacific. This notice was followed by an excellent figure in the volume of the succeeding year (1842), tab. 28. Here the native country is determined, and observations respecting the genus offered, showing that, "in a large Natural Order so extremely simple in structure as the *Liliaceæ*, the differences between the genera are necessarily very slight; and hence we find that such groups as *Scilla*, *Ornithogalum*, *Allium*, *Gagea*, *Urginea*, and many more, are distinguished as much by habit as by any absolute variations of structure." Thus he doubts if this plant be a genuine *Ornithogalum*, "none of the genuine species of which have a branched inflorescence; and its singular perianth, whose seg-

ments at first cohere by the points, while they separate at the sides, thus acquiring a globose appearance, increases the doubts that arise as to its being an *Ornithogalum*. Nevertheless, with the exception of the dispermous seeds, nothing seems to warrant the separation of the plant as a new genus." Dr. Lindley then suggests the subgeneric name of *Chlorogalum*, which the late Professor Kunth has adopted as a genus, including the two supposed species, *C. divaricatum* ("patria ignota") and *C. pomeridianum*; but which must now merge into *Chlorogalum* (if indeed the cause of botany is furthered by its adoption) *pomeridianum*.

The species would appear not to have been among the specimens in the Herbarium of Mr. Hindes, for it is not noticed in Mr. Bentham's 'Botany of the Voyage of H.M.S. Sulphur,' nor indeed does there appear to have been one plant of the Natural Order *Liliaceæ*:—the only dried specimens we have seen are of Mr. David Douglas, from California, in Mr. Bentham's Herbarium, now in possession of the Royal Gardens of Kew.

In regard to our having received bulbs of the same plant from China, this is easily accounted for. John Chinaman is a shrewd fellow, and ready to take advantage of what may benefit him in other countries as well as his own: and from California, peopled of late years to a remarkable degree by Chinese, he has carried back with him to his own country a plant that will afford him the means of washing his clothes without the need of purchasing soap. Sir John Bowring is informed that they use this bulb as soap without any artificial preparation.

NOTICES OF BOOKS.

TUCKERMAN, EDVARDUS; LICHENES AMERICÆ SEPTENTRIONALIS EXSICCATI. Fasc. III. et IV. 4to. Bostoniæ, Nov. Angl., 1854.

These two Fasciculi form a second volume of a very valuable work, illustrative of the Lichens of North America, executed by Edward Tuckerman, Esq., a gentleman of profound knowledge in this as well as in other departments of botany. The specimens are most beautifully prepared, and attached so well and so neatly to strong paper, that the volume is as manageable as if it consisted of a series of plates instead of specimens; and nearly the whole of them in a splendid state of fructification. The two former numbers comprised 50 species, the

two present, or second volume, bring the number to 100. They are accompanied by the generic and specific name, a reference to the Author's 'Synopsis of the Lichens of North America,' the locality, and now and then some valuable notes. No. 51 is Usnea angulata, *Ach.*, from Texas (perhaps too near the well-known U. hirta). 52. Evernia Fremontii, *Tuckerm.* MSS., California. 53. Evernia vulpina, *Ach.*, California (and which may be seen on the bark of the Mammoth Tree of California, *Wellingtonia gigantea*, now exhibited in London). 54. Evernia prunastri, *Ach.* 55. Evernia furfuracea, *Mann.* 56. E. furfuracea, *β*, Cladonia, *Tuckerm.* 57. Ramalina Menziesii, *Tayl.* in Hook. Journ. of Bot. vi. 189, first detected by Menzies, California; its fronds constitute a beautiful tissue of network. 58. Ramalina calicaris, *β*, fastigiata, *Fr.* 59. Cetraria nivalis, *Ach.*, from the summits of the White Mountains. 60. Cetraria ciliaris, *Ach.*, arboricola. 61. Cetraria lacunosa, *β*, Atlantica, *Tuckerm.* 62. Nephroma arcticum, *Fr.*, with apothecia an inch broad! 63. Peltigera venosa, *Hoffm.* 64. Solorina saccata, *Ach.* 65. Sticta crocata, *Ach.* 66. Sticta quercizans, *Ach.* 67. Sticta scrobiculata, *Ach.* 68. Sticta pulmonaria, *Ach.* 69. Parmelia perforata, *Ach.* 70. Parmelia tiliacea, *Fr.* 71. Parmelia placorodia, *Ach.*, sepincola. 72. Parmelia physodes, *Ach.* 73. P. physodes, *β*, enteromorpha, *Tuckerm.* 74. Parmelia colpodes, *Ach.* 75. Parmelia caperata, *Ach.* 76. Parmelia incurva, *Fr.* 77. Parmelia ambigua, *Ach.* 78. Parmelia centrifuga, *Ach.* 79. Parmelia parietina, *α*, foliacea, *Fr.* 80. Parmelia chrysophthalma, *Ach.* 81. Parmelia speciosa, *Ach.* 82. Parmelia speciosa, *β*, galactophylla, *Tuckerm.*, a most beautiful variety. 83. Parmelia stellaris, *Fr.*, *α*. 84. Parmelia stellaris, *β*, hispida, *Fr.* 85. Parmelia stellaris, *γ* (tribacia), *Fr.* 86. Parmelia cæsia, *α* (stellata), *Fr.* 87. Parmelia obscura, *β*, ulothrix, *Fr.* 88. Parmelia fibrosa, *Fr.*, *β*, stellata, *Tuckerm.* 89. Parmelia brunnea, *Ach.* 90. Parmelia pallescens, *Fr.*, *α* (sepincola). 91. Parmelia ochrophæa, *Tuckerm.*, MSS. 92. Parmelia varia, *Fr.*, *α* (sepincola). 93. Parmelia cerina, *Ach.* 94. Stereocaulon corallinum, *Fr.* (our *St. paschale*). 95. Cladonia degenerans, *Floerk.* 96. Biatora porphyritis, *Tuckerm.* 97. Opegrapha stictica, *Fr. et Tuckerm.* MSS. 98. Trachylia phæomelana, *Tuckerm.* MSS. 99. Sphærophoron fragile, *Pers.* 100. Gyrostomum urceolatum, *Fr.*—This volume, equally with the former one, cannot fail to be very acceptable to the Cryptogamic botanist.

North Australian Botany, *Observations on, by* **Dr. Frederick Mueller**, Botanist to the N. W. Australian Government Expedition,* under the command of Mr. Surveyor Gregory; *in a Letter to* Sir W. J. Hooker. *(Published with the sanction of the Colonial Office.)*

Main Camp on the Victoria River, 18 June, 1856.

In the expectation of joining Mr. Gregory's party, and leaving this camp again in a few days, I am anxious to avail myself of the only opportunity which might offer itself, before our return to the settlements on the eastern coast, of laying before you a short account of the principal results of my botanical labours in North and Central Australia. Perhaps I flattered myself too much when I thought the information which I gained, of the botany of this part of the globe, important enough to arrange it roughly for an early communication; but I am well aware that yourself and many of your scientific friends are watching with intense interest the progress of phytological knowledge of Australia, and moreover of these remote and untrodden parts of the country. I have therefore, with Mr. Gregory's permission, collected some of the principal notes for this letter, and appended to it the description of 12 new genera and 25 new species, which, to me at least, appeared to be extremely interesting. You will be aware that I am under the restriction of retaining all information for the Government; and if you therefore think any of my observations important enough for early publication, it will require the sanction of the Secretary of State for the Colonies, which in all likelihood will be easily ob-

* Our latest account received from the Botanist of this Expedition, appeared at p. 46 and following pages of the present volume, and was despatched from on board the 'Monarch' on the arrival at the mouth of the Victoria River. It has been stated in the 'Times' of this day (Oct. 21), that—

"On landing, the party unfortunately lost 14 horses and 150 sheep, but still established a camp on Victoria River. Early in January, Mr. Gregory, with nine officers, began to ascend the river, and finally reached its sources, in sandstone ranges, 1400 feet above the sea. The ranges run east and west; and the opposite fall of water is therefore to the south. Crossing this watershed, Mr. Gregory struck on a creek, which led him 300 miles further, west of south, to lat. 20° 15′ south, and long. 127° 45′, when he discovered the Salt Lake, in a sandy desert, correctly prognosticated by that great Australian discoverer, Sturt. Thence the party returned in safety; and Mr. Gregory was preparing for a second start from his depôt, across the country to the east, as far as Albert River, where he expects to find more fertile land. Mr. Gregory had, during the Expedition, gained the full confidence of his party, and been throughout on the best terms with the natives."

tained, as I refrain from all general information on the results of the Expedition, since Mr. Gregory's official reports will reach England simultaneously with this letter. I only state, and am proud to do so, that I, with one of our best men, was selected to push, with the two Messrs. Gregory, into Central Australia; and I perform a pleasant duty when I thankfully acknowledge, on this occasion, that Mr. Gregory has not only given me all the opportunities which the Expedition afforded for promoting my objects, but gave me also liberty to make the best of my time during our stay on this camp, so that I was enabled to examine here the greater part of those plants which I had not yet analyzed during the progress of our travels. Thus I have written the diagnostics of more than 300 species and about 20 genera, either new to the Flora of Australia or imperfectly known, and in most instances the diagnosis is accompanied by a detailed description. You will be surprised to see the accompanying article headed by *Adansonia Gregorii!* The Gouty Stem-tree of All. Cunningham and Captain Stokes is a true *Adansonia* in every point; and who deserves more to have his name attached to the best plant disclosed by this Expedition than our leader? to whose prudence, skill, and perseverance not only the general and geographical results of the Expedition are due, but also the success of the labours of all his followers.

I am at present unable to give an accurate account of the real number of species collected; but I believe they do not exceed 800 species, exclusive of what has been obtained on the eastern coast,—a number to be considered scanty in the extreme, if we consider the actual extent of the lines of our explorations, which fall scarcely short of 3000 miles. The want of changes in the geological formation throughout the country which we traversed, may partially account for the paucity of plants; whilst, on the other hand, the whole tract is devoid of a mountainous flora, since real mountains do not exist, and the highest point of the dividing table-land, between the Victoria River and Sturt's Creek, is, according to Mr. Gregory's calculations, not elevated more than 1660! We met, only on one locality, a small granite ridge, which yielded a few remarkable plants,—amongst them the strange *Erythrina biloba.* The principal geological features are sandstone of the carboniferous series, which forms the table-land, and basaltic plains and ridges; nor is it likely that the geological formation of the country will contribute to the richness of its Flora until we leave the Gulf of Carpentaria, between

which and Moreton Bay in all likelihood the principal harvest of plants will be reaped.

Impossible as it is to send at present extensive copies of my writings home, I will endeavour to furnish you with a hasty review of my notes. Amongst *Thalamifloræ* occur 2 species of *Ionidium* new to Australia (*I. purpureum* and *aurantiacum*); of *Cissus* also 2 species, as I have been obliged to refer the *Vitis* mentioned by Captain Stokes (*C. acida*) also to this genus. Of *Capparis* I have 3 species, of *Cleome* also 3, one having pink flowers and the habit of an Oxalis (*C. flava*, *C. tetrandra*, *C. oxalidea*). *Sapindaceæ* comprise *Cardiospermum*, several fine new *Dodonæas*, and a new genus, *Distichostemon*, allied to *Dodonæa*. *Zygophylleæ* are, even in the interior, destitute of the genus which forms the type of the Order; but I discovered a new *Tribulus* (*T. ranunculiflorus*) remarkable for having 1–2-seeded carpels, so that, with its upper leaves alternate, it comes into close contact with *Tribulopsis*, which furnished a beautiful new species, *Tribulopsis heteranthera*, advancing the genus again to 3 species, since *T. angustifolia* has been reduced to *T. Solandri*, which, with *T. pentandra*, is very common even in the interior. *Tribulus acanthococcus* has been also seen, like *Drosera angustifolia*, from the Murray. *D. petiolaris* is common, and occasionally accompanied by other species, of which one produces beautifully blue petals. *Polygala*, mentioned by R. Brown as existing in the tropics of Australia, is represented by 3 or 4 species distinct from the southern one, but *Comesperma* is wanting, or at least not found. *Corchorus* and *Triumfetta*, both with 4 species, augment their small Order considerably in Australian botany. One species of *Triumfetta* (*T. plumigera*) is remarkable for a capsule which is not woody, and long plumose setæ of the fruit, characters that may entitle it to generic distinction. Dr. Steetz's excellent paper on Australian *Buettneriaceæ* will receive a supplement in 1 sp. of *Seringia*, 1 sp. of *Melochia*, 1 sp. of *Melhania*, 1 sp. of *Rulingia*, 1 sp. of *Waltheria*, mentioned by All. Cunningham, and 1 of *Ridleya*. *Malvaceæ* form a predominant family with many species of *Sida* and *Hibiscus;* one species of the former genus, *Sida* (*Abutilon*) *leucopetala*, having fine white flowers. *Gossypium Australe* is common as far as we went, and an *Abelmoschus* (*A. albo-ruber*) differs from *Ab. splendens*. A new *Southwellia* has quadrifid flowers, and also 2 sp. of *Brachychiton* have been seen. Of *Melhorium* I met 1 sp.; of *Frankenia* 1; of *Boronia* 3; of *Polycarpæa* 4; of *He-*

mistemma 1; of *Hibbertia* several; of *Thouinia* 1; of *Pittosporum* 1; of *Elæocarpus* 1. With *Cochlospermum heteroneurum*, *Pachynema complanatum*, *Nymphæa cærulea*, *Carapa Moluccensis*, and 3 species of *Melia*, I conclude the remarks on *Thalamifloræ* as far as they are examined.

Amongst *Calycifloræ* I noticed 2 sp. of *Trianthema*, 1 of *Sesuvium*, 5 of *Portulaca*, including the cosmopolitan species, which proved exceedingly beneficial to us, 2 sp. of *Calandrinia*, 2 of *Mollugo*, *Glinus lotoides*, and a new genus amongst *Portulaceæ*. *Euphorbiaceæ* are not so numerous as might be expected, comprising several *Phyllanthi*, 4 sp. of *Euphorbia*, 1 of *Rottlera*, 1 of *Leptoneura*, and two new genera, besides a few plants unexamined, and *Adriana acerifolia*. Of *Myrtaceæ* I saw a new *Lhotzkya* (*L. cuspidata*), 3 sp. of *Calycothrix*, 1 sp. of *Verticordia* (*V. scariosa*), 1 of *Bæckea*, 1 of *Kunzea ?*, about 12 *Eucalypti*, including *E. rostrata*, 4 sp. of *Melaleuca*, 2 sp. of *Tristania*, 1 sp. of *Jambosa*, and a new genus (*Xanthostemon*), which requires yet to be compared with your *Backhousia*, of which I have no diagnosis at hand. *Barringtonia* shows here 2 splendid species, *Melastoma* 1, *Osbeckia* 1, *Haloragis* 3, including *H. glauca* and *H. aspera*. *Umbellifloræ* are reduced to 3 species; two of them form a most remarkable genus, *Hemicarpus*, having only 1 mericarp developed; the third species is of the appearance of a *Sison*, and bore, on the solitary place where it was seen, neither flowers nor fruits. *Lythraceæ* are more numerous in Australia than was expected, comprehending 4 species either of *Ammannia* or *Rotala*, 1 new genus (*Calopeplis*), allied to *Lythrum* and *Peplis*. Of *Cucurbitaceæ* I found 1 *Luffa*, 1 beautiful *Trichosanthes*, 2 sp. of *Cucurbita*, of which one (*C. jucunda*) yields eatable fruit, and an unexamined genus. Dr. Leichhardt speaks of several other *Cucurbitaceæ*, which I have evidently not yet seen. Of *Stackhousieæ* occurs but 1 sp. *Leguminosæ* form the largest Order of all, with about a dozen *Acacias*, including *A. dimidiata*, *dolibrata*, *lycopodifolia*; 8 *Cassias*, all distinct from those in the South, one having only 3 or 4 flowers (*C. oligandra*); a second and very marked species of *Petalogyne* (*Petalostylis*, R. Br., non Griesebach) which I named *P. cassioides*,* *Abrus precatorius*, *Inga moniliformis*, *Bauhinia Leichhardtii*, *Erythrina Vespertilio*, *E. biloba*,

* The diagnosis of the new *Petalogyne* is as follows:—*P. cassioides*; diffusa foliis pluri-multijugis, foliolis obovatis apice retusis vel emarginatis mucronulati supra glabriusculis subtus cum rhachi parve pilosulis, pedunculis axillaribus solitarii

n. sp., a splendid *Agati* with white flowers 2″ long, and pods often more than 2′ long; *Sesbania Australasica* and two other species, one very large, with pink flowers; *Vigna*, 1 sp.; *Desmodium*, 3 sp.; *Loureu*, 1 sp.; *Diserma*, 1 sp.; *Rhynchosia*, 1 sp.; *Indigofera*, 8 sp., one being monospermous; *Psoralina*, belonging also to the genus; *Crotalaria*, 9 sp., one, seemingly *C. verrucosa*, with blue flowers, another with large green flowers; *Zornia*, 3 sp. distinct from *Z. dictyocarpa; Leptocyamus*, at least 1 sp.; *Tephrosia*, several sp.; *Æschynomene*, 1 sp.; *Atylosia*, 2 sp.; *Daviesia egena; Bossiæa*, 1 sp.; *Jacksonia*, 2 sp.; and 2 excellent new genera, *Nematophyllum* and *Oxycladium*. Many of my *Leguminosæ* are not yet examined. Amongst *Loranthaceæ* are charming plants, and I have described their vivid colours from living specimens: one has green flowers. *Onagreæ* are reduced to 1 sp. of *Ludwigia* and 2 sp. of *Jussiæa*. Amongst *Rubiaceæ* I have done little else than to ascertain that the *Sarcocephalus* mentioned by Dr. Leichhardt is a splendid large arboreous *Morinda*, which I named after my unfortunate countryman; that 2 *Gardenias*, 4 *Hedyotis* sp., 4 *Spermacoce* exist; the unexamined rest contains *Psychotricha* and some genera not noticed by Cunningham, but I have, on the other hand, not seen all those which he enumerates. *Rhamnaceæ* and *Celastrineæ* are very scarce: the former includes *Zizyphus melastomoides*, All. Cunn. I was greatly disappointed to see in the desert so little of my favourite Order, the *Compositæ*, although I presumed that they would vanish greatly in the coast tract. Having dissected all of them, I give the enumeration:—*Calotis*, allied to *C. breviseta; Wedelia*, 1 sp.; *Wollastonia*, 1 sp.; *Vernonia cinerea; Sphæranthus megacephalus*, n. sp.; *Eurybia brachycomoides*, n. sp.; *Pluchea erigeroides*, n. sp.; *Blumea Cunninghami, B. integrifolia, B. senecionidea*, a fine, tall species, with all flowers fertile, forming a new subgenus, *Asteira; Spilanthes australis, Flaveria Australasica, Bidens* sp., *Glossogyne tenuifolia, Diodontium filifolium*, an excellent new genus of *Verbesineæ*, *Eurybiopsis macrorrhiza, Myriogyne minuta, Sphæromorphæa petiolaris, Therogeron integerrimus, Rhodanthemum minus* and *odoratum*, a new genus close to *Vittadinia*, *Monenteles*, 2 sp., *Gnaphalium luteo-album*,

unifloris calyce longioribus, stylo cymbiformi acuto integerrimo basi hastata valde curvato, sepalis inæqualibus.

In deserto ad flumen Sturt's Creek, necnon ad ripas glareosas fluvii Victoriæ superioris.

Præter notas datas diversa a P. labicheoide (*Petalostyli labicheoide*, R. Br., in Sturt's 'Central Australia,' App. p. 80) statura humiliore et foliolis multo minoribus.

Chrysocephalum sp., *Helichrysum bracteatum*, *H. spathulifolium*, n. sp., *H. leptorhynchoides*, n. sp., *Coleoroma Centaurea*, an interesting n. g. of *Centaurineæ*. *Sonchus* and *Senecio* are wanting! *Stylidium* has been augmented by 9 n. sp., of which it was advantageous to describe them minutely from fresh specimens. *S. rotundifolium* and *S. alsinoides* have also been seen. *Lobelia* comprises 2 n. sp. Of *Goodenovieæ* I shall be able to add to Prof. De Vriese's new work: I found about 20 species, of which *Scævola Kœnigii*, *revoluta*, and *ovalifolia*, *Calogyne pilosa*, *Goodenia purpurascens*, *mollis*, and *hispida* are described by R. Br. The rest contains *Goodenias*, some of great beauty, *Scævolas*, 1 *Velleya*, and 1 *Leschenaultia*. 1 *Scævola* is remarkable for having yellow flowers and exactly the appearance of a *Goodenia*, but a quadrilocular drupe.

Among *Corolliflora*, *Convolvulaceæ* are as numerous as might be expected, but yielded little new (two or three species of *Ipomœa*). Of Brownian species I found *Convolvulus multivalvis*, *Ipomœa denticulata*, *eriocarpa*, *alata*, *longiflora*, *heterophylla*, *dissecta*, *gracilis*, *pannosa*, *erecta*, *hederacea*, *incisa*; all the 3 species of *Breweria*; *Evolvulus*, which seem to belong to our polymorphous species, and one or two *Polymeriæ*; also *Cressa Cretica*. *Ipomœa biflora* is a var. of *I. erecta*. *Apocyneæ* contain *Parsonsia velutina*, *Balfouria saligna*, *Carissa ovata* and *lanceolata*, and *Strychnos lucida*. Of *Sapoteæ*, I have only *Sarsalisia sericea*; of *Campanulaceæ*, *Wahlenbergia gracilis*; of *Myrsineæ*, *Ægiceras fragrans*; of *Ebenaceæ*, *Maba ovata* and *Diospyros rugosula*; of *Jasmineæ*, *Jasminum divaricatum* and *J. molle*. *Myoporineæ* and *Verbenaceæ* are very interesting: the former are augmented by *Eremophila tuberculata*, n. sp., and *Pholidia stenochiloides*, n. sp. I saw also *Myoporum tenuifolium* and *Stenochilus longifolius* and *maculatus*. The latter Order afforded an *Avicennia*, distinct from the southern species, to the Australian Flora. Two new species of *Vitex* (*V. cardiophylla* and *V. triphylla*), besides *V. ovata*, a *Lippia*, a new *Pithyrodia* (*P. exsucca*), and a fine new genus from Central Australia, which I beg to name *Newcastelia*, to evince my gratitude to the exertions of his Grace the Duke of Newcastle in behalf of the North Australian Expedition. Of all the Brownian plants, I saw only *Clerodendron inerme*, *Vitex ovata*, and *Callicarpa adenophora*. *Labiatæ* are vastly at the decrease. I found only a new *Teucrium*, *Anisomeles salvifolia*, *Mentha australis!* 2 *Plectranthi*, not enumerated in the Prodromus; *P. moschatus*, of which *P. parviflorus*, R. Br. (non W.), is a variety.

Borragineæ contain a new tetrandrous genus with lobed leaves (*Lobophyllum tetrandrum*), *Halgania solanacea*, n. sp., *Heliotropium diversifolium*, n. sp., *H. pimeloides*, n. sp., *H. ventricosum*, *H. paniculatum*, *fasciculatum*, *tenuifolium*, *ovalifolium*, *Trichodesma Zeylanicum*, and an *Ehretia*. The small genus *Josephinia* is increased by 1 sp. *Bignoniaceæ* received, to *Spathodea heterophylla*, a new one (*S. nematophylla*). *Acanthaceæ* contain *Nelsonia campestris*, 3 sp. of *Adenosma*, 1 of *Dicliptera*, *Hygrophila angustifolia*, 1 sp. of *Rostellularia*, *Hypoestes floribunda*. *Asclepiadeæ* contain 2 very distinct *Gymnemas*, a new *Cynanchum*, *Microstemma tuberosum*, *Oxystelma carnosum*, *Sarcostemma Australe*, *Secamone ovata*, *Gymnanthera nitida*, *Cynanchum pedunculatum*, and a few unexamined plants. *Scrophularineæ* yielded a yellow *Mimulus*, *Buchnera asperata*, *curviflora*, *parviflora*, *Centranthera hispida*, *Lindernia scapigera*, *alsinoides*, and 2 sp. of a genus which differs solely from *Lindernia* in being diandrous; *Morgania glabra*, *pubescens*; a *Gratiola*, *Herpestis floribunda*, *Limnophila gratioloides*, *Microcarpæa muscosa*, and a genus which differs solely from *Peplidium* in its one-celled anthers. *Solana* are not unfrequent: *S. echinatum* and *biflorum* I recognize with certainty amongst them; the latter is distinct from my *S. pulchellum*; *Physalis parviflora* is rare; Leichhardt's *Datura* has not yet been seen. *Gentianeæ* contain, besides *Orthostemon*, *Erythræa* and *Limnanthemum crenatum*, *geminatum*, and *nymphææfolium*, a new pygmæous species of the latter genus, with small white flowers (*L. minimum*), and a host of *Mitrasacmes*, which are, with exception of *M. ramosa*, *laricifolia*, *prolifera*, *elata*, *stellata* (with yellow flowers), new. *Utricularia* has 4 sp. here; *U. chrysantha!* *U. exoleta*, *U. azurea*, n. sp., *U. fulva*, n. sp.; the latter resembles more an Orchideous plant than anything else. *Plumbagineæ* have *Ægialitis annulata* and *Plumbago Zeylanica*.

None of the Monochlamydeous Orders is here extensive, which I regret, particularly with regard to *Proteaceæ*, of which I have seen the following:—*Persoonia falcata*, *Banksia tomentosa*, *Grevillea Goodii*, *G. Dryandri*, *G. chrysodendron*, *G. heliosperma*, *G. refracta*, *G. leucodendron*, *G. mimosoides*, *G. striata*, *G. agrifolia*, *G. angulata*, *Hakea longifolia*, *H. arborescens*, and a new species allied to the former. *Grevillea* yielded only 2 new species, which, with the first *Helicia* found in Australia, I have described in the following pages, in order, if you would show me the kindness, that Prof. Meisner might insert

them yet in the appendix of his monograph.* I did the same with a new *Pimelea*, which, with a blood-red species, perhaps *P. punicea*, represent alone *Thymeleæ*. *Laurineæ* are reduced to 1 species of *Gyrocarpus* and *Cassytha*; *Olacineæ*, to *O. aphylla*. *Santalaceæ* contain *S. lanceolatum*, which has black fruits, *Exocarpus latifolia*, and *Anthobolus filifolius*. *Chenopodieæ* are much rarer, as I expected, even in the saline parts of the desert; but some of the species are new, as of *Anisacantha* and *Kentropsis*, a remarkable little *Blitum*. I saw further *Salsola Australis*, of which *S. macrophylla* seems to me a var., *Halocnemum Australe*, *H. Indicum ?*, *Arthrocnemum Arbuscula*, the Mitchellian *Kochias*, *Enchyloma tomentosa*, *Rhagodia hastata*, *Chenopodium auricomum ?*, *Rhagodia* sp. Of the *Amaranthaceæ* I have been unable to determine all, not having Moquin's excellent memoir at hand. There are several; *Euxolus* species, *Trichinium incanum*, *T. nobile*, *T. gracile*, *T. distans*, *T. Preissii*, *Ptilotus corymbosus*, and two other species, of which one is remarkable for opposite leaves; *Gomphrena*, several species, *Alternanthera denticulata*, which I think is not to be distinguished from *A. nodiflora*; also a little, erect species, *Achyranthes Australis*, which passes gradually into *A. canescens*. *Polygonum Cunninghami* is very common on the half-saline banks of the Victoria River, as also in many places of the interior, besides which, only another species of *Polygonum* occurs. *Nyctagineæ* reckon only one *Boerhaavia*, but this so polymorphous, that I should not be surprised to see it under six names in the collections; it is often pentandrous.

Of *Cycas*, I saw *C. media*; of *Coniferæ*, 1 *Callitris*, 1 of *Casuarina*; of *Ficus*, 5 species. But is it not extraordinary that in all my travels here I met with only 2 species of *Orchideæ*,—*Cymbidium canaliculatum*, and a *Dipodium*, distinct from *D. punctatum ?* Equally startling it must appear, that even on the shady moist banks of this noble river, or on its fine cataracts well overhung with Ferns, hardly any Mosses or Lichens exist! I saw only one *Hypnum*, allied to *H. cupressiforme*, and *H. Muelleri*, in fruit! and the sterile species do not amount to more than five or six. With the exception of Grasses all Monocotyledonous Orders are comparatively limited. I have *Seaforthia elegans*, *Livistonia inermis*, *Cæsia gilva*, n. sp., *Chlorophytum xerotinum*, n. sp., *Thysanotus chrysanthurus*, n. sp., *Asparagus fasciculatus*,

* The monograph of Professor Meisner, to which Dr. Mueller alludes, has very recently appeared in the volume of De Candolle's 'Prodromus.'

three new species of *Hæmodorum, Xyris lævis, X. paludosa,* and a new one, a *Typhonium,* which forms a subgenus distinct from *Sauratium;* several *Eriocaulons,* one *Triglochin, Crinum angustifolium, Pandanus pedunculatus,* and a species with free drupes, which, if distinct from the Indian kinds, may be called *P. aquaticus,* as it indicates, and lives permanently in water, and has been introduced as "Water Pandanus" in Dr. Leichhardt's work. *Tacca pinnatifida* is common; *Najas Indica, Potamogeton natans,* a *Ledebouria!,* and a new *Alisma* (*A. acanthocarpum*) remarkable for a limited number of thorny carpels, are our water plants. *Typha,* 1 species, *Dioscorea bulbifera, Anguillaria Indica, Cartonema spicatum, Aneilema anthericoides, Cyanotis,* n. sp. (*C. canaliculata*), *Commelyna undulata,* and a species not described by R. Br. *Flagellaria Indica,* and one *Desvauxia,* comprise the rest of *Monocotyledoneæ,* with exception of *Cyperoideæ* and Grasses. Of the latter I can only say, that, to our horses' delight, they prove next *Leguminosæ* to be the largest Order in this part of Australia, and contain a good deal that is new; for instance, two undescribed *Anthistirias,* two new species of *Cenchrus,* several, at least in Australia, unknown; *Andropogons, Neurachne, Oryza, Lappago,* and *Glyceria* seem formerly unnoticed within the tropics of Australia. I have recognized *Sporobolus Indicus, pulchellus,* a species of *Perotis,* several *Aristidas, Poa polymorpha, P. tenella, Triodia pungens, Arundo Phragmites, Eriachne squarrosa, glauca, avenaria, capillaris, Pappophorum pallidum, P. purpurascens, Triraphis pungens, T. mollis, Ectropia leporina, E. spadicea, Dactyloctenium,* sp., *Chloris,* several species, including *Chl. Moorei, Cynodon tenellus, C. polystachyos, Milium,* sp., *Paspalum orbiculare,* a new species, *Panicum gracile, argenteum, P. holosericeum, P. Crus-Galli, P. semialatum, P. decompositum, P. lævinode, P. papposum, P. spinescens,* and several which I consider new. *Xerochloa,* sp.; *Thouarea,* sp.; *Spinifex longifolius, Anthistiria australis, Andropogon intermedius, bombycinus, fragilis, citreus, Erianthus irritans, E. fulvus, Imperata arundinacea, Ischæmum rottboellioides* and other species, *Rottboellia formosa, Ophiurus corymbosus* and a second species. Amongst *Cyperoideæ* is a *Scirpus,* new for the Australian flora, several *Cyperi, Hypæliptum microcephalum, Fuirena glomerata, Isolepis barbata, Heleocharis compacta, H. capitata,* about twenty *Fimbristylis* sp., which I have all minutely described, as the greater part is new; *Abildgaardia* sp., *Rhynchospora longiseta, Scleria margaritifera, S. pygmæa.* I am sorry to state that

I shall be unable to contribute much to your collection of Ferns, as they are your particular favourites. I have collected *Marsilea*, what I consider *M. quadrifolia*, in numerous forms, *Schizæa bifida* (very rare), *Blechnum striatum*, *Nephrodium propinquum*, *Acrostichum fraxinifolium*, *Platyzoma microphyllum*, *Gleichenia microphylla*, *G. Hermanni*, *Notochlæna vellea*, *Cheilanthes tenuifolia*, *Pteris umbrosa*, an *Ophioglossum* and a *Lycopodium*, both undescribed in R. Br.'s work. *Fungi*, at least the larger kinds, are very rare indeed.

Taking a retrospective view, you will observe that the following Orders of plants, occurring in other parts of Australia, are here either entirely obliterated, or that they can be only very scantily represented, for of none of the following has a single plant been obtained throughout five degrees of longitude and six degrees of latitude:—*Ranunculaceæ*, *Magnoliaceæ*, *Cruciferæ*, *Papaveraceæ*, *Hypericinæ*, *Geraniaceæ*, *Lineæ*, *Oxalideæ*, *Tremandreæ*, *Elatineæ*, *Scleranthеæ*, *Mesembryanthemeæ*, *Tetragoniaceæ*, *Nitrariaceæ*, *Ceratophylleæ*, *Cunoniaceæ*, *Rosaceæ*, *Caprifoliaceæ*, *Araliaceæ*, *Brunoniaceæ*, *Epacrideæ*, *Oleineæ*, *Primulaceæ*, *Orobancheæ*, *Plantagineæ*, *Callitrichineæ*, *Atherospermeæ*, *Castaneæ*, *Irideæ*, *Hypoxideæ*, *Aphyllanthaceæ*, *Smilacineæ*, *Xerotideæ*, *Junceæ*, *Hydrocharideæ*, *Lemnaceæ*, *Restiaceæ*. Several common genera of the South have likewise never been met with; for instance, *Carex*, *Lepidosperma*, *Sonchus*, *Senecio*, *Pultenæa*, *Dillwynia*, and most of the allied genera, *Pomaderris*, *Leptospermum*, *Stellaria*, etc.; but my list contains, as you may observe, many genera never noticed by any writer on Australian phytology. *Melochia* is in this behalf perhaps most interesting.

I might have extended this summary much further; but, in the hope that it will convey to you a general idea of the Flora of this part of the globe, I shall close it here, praying you will excuse its hasty compilation, as the greater part is written at night-time. I reckon to be able to add, between this and the Gulf of Carpentaria, 100 new species to the collection, although the autumn season is unfavourable. At all events, I shall be able to add to my notes, and to increase the collections of seeds. The greatest harvest I can expect to reap is between the Gulf of Carpentaria and Moreton Bay, provided that Mr. Gregory is able to increase his party to such a number, that I can join again. I believe that we shall require three months to reach the Albert River, and we will start tomorrow. Our party consists of Mr. A. Gregory, Mr. H. Gregory, Mr. Elsey, three men, and myself. I have for my share to

attend to five horses, which I have of course to saddle and to pack,—which is but a fair and necessary arrangement, as actually every individual is only attending thus to the conveyance of the means of his subsistence and his comforts. Should circumstances frustrate our meeting the vessel, we might then be expected to reach, under the protection of Providence, Moreton Bay or some part of the eastern settlements in eight or nine months. Considering this emergency, our equipment is as light as possible, to enable us thus to carry the greatest quantity of food (flour, rice, salt pork, tea, and sugar) possible; I could therefore not convey more than half a ream of light paper. I was under similar restrictions when we pushed into Central Australia, as we might have been cut off from our retreat, like Captain Sturt, for many months; the consequence is, that the number of specimens brought from the interior is but limited; and I regret to say, that many are in a sad condition, many having been carried more than 1500 miles on horseback. I only hope that, after having escaped narrowly soaking in fording the watercourses at various times, they will safely reach their destination.

Before concluding this letter I have to ask a great favour, Sir William; namely, if I find other circumstances not adverse, to be permitted to take myself the collections home to England for description. My review of *Crotalaria* and other genera has proved to me sufficiently, that I ought to compare the Indian plants before I can safely establish Australian species, in many cases. One year and a half at home would be sufficient for this purpose, if you would extend towards me your well-known liberality, and open me your collections; and I think the Government might at least give me a free passage, since I have not been incurring expense to them previous to my arrival in Sydney. This home journey would also give me the opportunity to publish the Flora of Australia Felix and South Australia, for which I might consider my materials almost complete. How delightful it would be to me to express personally my veneration for you!

Mr. Baines desires to be remembered to yourself and to the famous Dr. Burchell; and I wish that you, Sir William, as well as Drs. Hooker and Harvey, and Mr. Latrobe, will retain in kind remembrance your most obedient and devoted,

FRED. MUELLER.

(To be continued.)

Definitions of Rare or hitherto Undescribed AUSTRALIAN PLANTS, *chiefly collected within the boundaries of the Colony of* Victoria; *by* Dr. FREDERICK MUELLER, Government Botanist for the Colony of Victoria.

(*Continued from p.* 210.)

169. Phyllanthus *lacunarius*, F. Muell.; annual, smooth, glaucous; stem upright, branched; branches angular; leaves imbricate, deciduous, obovate or cuneate-oblong, obtuse, on short petioles; flowers monœcious, axillary, solitary, on short pedicels; sepals minute, subovate, obtuse, with broad, membranaceous margins; stigmata very short; capsule depressed, trigastrous; seeds trigonal, blackish, with longitudinal streaks.

HAB. On the margins of lagoons which become dry during summer, at the junction of the Murray and Darling Rivers.

170. Phyllanthus *Fuernrohrii*, F. Muell.; fruticulose, upright, branched, with a grey, velvet-like indument; branches nearly terete; leaves imbricate, deciduous, spathulate-obovate, on very short petioles, apiculate; pedicels axillary, subsolitary, half the length of the leaves; sepals lanceolate-ovate, acutish, with membranaceous margins, outside as well as the depressed capsule hairy-scabrous; seeds brown, lævigate.

HAB. On gravelly sand-hills near the Murray; rare.

This species received its name in grateful acknowledgment of much kindness which the author experienced from Professor Fuernrohr, in Ratisbon.

XLVII. JUNCAGINEÆ.

171. Triglochin *nanum*, F. Muell.; annual, extremely small; root fibrous; leaves narrow-linear, channelled, nearly blunt, shorter than the threadlike, somewhat angular scape; fruits on spreading stalks, pyramidal-linear, consisting of three carpels, which are slightly dilated at the base, inside glabrous, on the back very thin-keeled, and on both sides narrow-margined.

HAB. On mossy rocks frequent in South Australia, rarer in Victoria. Quite of the habit of *T. centrocarpum*.

XLVIII. ASTELIACEÆ.

172. Astelia *psychrocharis* (Sect. *Tricella*), F. Muell.; root thick;

leaves rigid, from a broad base narrow-lanceolate, sharp-keeled, on both sides, together with the scape, silky, their margins nearly flat; female racemes few-flowered, condensed to a conglomerate panicle which is much shorter than the leaves; calyx persistent, outside silky; capsules baccate, red, ovate, beaked with the style, three-celled; seeds angulate, ovate, shining.

HAB. On wet, mossy places in the Australian Alps, at sources of the Murray and Snowy Rivers.

Leaves much broader, but not longer, than those of the *A. alpina.*

173. Xerotes *juncea*, F. Muell.; stemless; leaves long, terete or slightly compressed, streaked, with teethless, pungent apex, much longer than the simple, few-headed scape; flowers of each sex conglomerate-verticillate.

HAB. In the Port Lincoln district, *C. Wilhelmi.*

Much more robust than *X. spartea*, and in some degree also allied to *X. leucocephala* and *typhina.*

XLIX. ERIOCAULONEÆ.

ELECTROSPERMA, F. Muell.—*Flowers* in androgynous heads, all furnished with a bracteole. *Receptacle* conical, as well as the bracteola smooth. *Male flowers* central, pedicellate. *Sepals* smooth, the three external coherent at the base; the three internal concrete into a long tube, the free lobes bearing a gland. *Stamens* six, inserted on the limb. *Anthers* bilocular, introrse. *Female flowers* marginal on short pedicels, destitute of a calyx. *Style* one, short, with three filiform stigmata. *Capsule* smooth, tricoccous, loculicide-dehiscent. *Seeds* in the cells solitary, smooth, not costulate, of the structure of *Eriocaulon.*

This genus is chiefly characterized by the want of the floral envelope in the female flowers, but agrees otherwise in habit and structure with *Eriocaulon.* The name is derived from the colour and shining transparency of the seeds, not unlike amber.

174. Electrosperma *Australasicum*, F. Muell.

HAB. On wet places along the Murray, towards the junction of the Murrumbidgee.

A small, annual, scape-bearing herb; leaves grass-like, fenestrate-nerved, pellucid; scape monocephalous, vaginate at the base.

L. CYPEROIDEÆ.

175. Scirpus *polystachyus*, F. Muell.; stems tall, trigonous, foliate,

glabrous; leaves flat, on the keel and margins scabrous; cyme terminal, many times compound, little shorter than the three or five bracts of the involucre; spikelets ovate-oblong, partially solitary-stalked, partially glomerate; bracteoles somewhat keeled, lanceolate-ovate, awnless, naked on the margin, blackish-green and somewhat scabrous at the back; style trifid; caryopsis roundish-ovate, plano-convex, slightly angulate at the back, short-mucronate, pallid, even; the hypogynous bristles at the top puberulous, variously curved, much longer than the fruit.

HAB. Along the rivulets and streams of the lower part of the Australian Alps; for instance, at Mount Leinster, Omeo, and Gibbo Creek, Snowy River, etc.

Spikelets of the size of *Scirpus radicans*, between which species and *S. silvaticus* it seems intermediate.

I add here the only new species of *Scirpus* with which I am acquainted, although not alpine.

176. Scirpus *leptocarpus*, F. Muell.; dwarf, annual; root fibrous; stems numerous, slender, angulate, streaked, one-leaved at the base; spikelets one to three, spuriously lateral, ovate, sessile, many-flowered; one bract of the involucre elongate, erect, at last horizontal; the other of the length of the spikelet; bracteoles oblong, acuminate, slightly recurved at the apex, straw-yellow, with brownish margin and green keel; style trifid; caryopsis trigono-cylindrical, finely dotted; hypogynous bristles white, slightly scabrous.

HAB. On moist or sometimes inundated localities on the Murray, Ovens, and King River.

177. Carex *polyantha*, F. Muell.; tall; leaves broad-linear, nearly flat, keeled, with the erect triquetrous stem a little scabrous; male spikes four or five, elongate-cylindrical, the lowest ramified by several short ones; female spikes three to five, very long, cylindrical, the lowest long-pedunculate, with remote flowers at the base; lower bracts very long, foliaceous, auriculate but not vaginate at the base; stigmas two; fruit brown, ovate, sessile, glabrous, dotted, on both sides convex and distinctly streaked, abruptly terminated into a very short, bidentate beak, as long as the lanceolate-subulate, black bracteoles; caryopsis compressed, round-ovate, straw-yellow, shining, even.

HAB. In the valleys of the Upper Mitta-Mitta, near Mount Hotham.

More allied to *Carex acuta* and *paludosa* than to any of the Australian, Antarctic, and New Zealand species.

178. Carex *cephalotes* (Sect. *Psyllophora*), F. Muell.; dwarf; root fibrous; leaves narrow-linear, channelled, scabrid, as long as the smooth, thin, triquetrous stem; spike terminal, solitary, androgynous, dense-flowered, roundish-ovate, generally bractless, with male flowers at the summit; stigmas two; fruit spreading, lanceolate-ovate, very short-stalked, terminated by a short, undivided beak, nerveless, even, green, with black-brown tip, slightly convex at the back, longer than the brown, ovate, acute, persistent, one-nerved bracteoles; basal arista wanting; caryopsis round-ovate, tapering into the base, brownish-yellow, even, shining.

Hab. On the grassy summits of the Munyang Mountains, moistened by the perpetual glaciers, or on the most elevated springs.

One of the handsomest species of a large cosmopolitan genus, allied to *Carex capitata*, from European and Asiatic Alps.

179. Oreobolus *distichus*, F. Muell.; leaves long, distichous, laxly imbricating, somewhat spreading, incurved, channelled, subulate, flat towards the summit, dilated and equitant at the base, serrulate-scabrous on the margin; peduncles angulate, furrowed, at last tereti-compressed; bracteoles two or three, large, unequal; scales of the perigynium lanceolate, acuminate; caryopsis even, ovate, acuminate.

Hab. In peat-moss on the highest summits of the Australian Alps.

Allied to *Oreobolus pectinatus*.

The present species must be considered as an interesting addition to the genus. For a long time *Oreobolus Pumilio*, originally from Tasmania, now also observed in the Australian Alps, remained the only species. Gaudichaud added *Oreobolus obtusangulus* from the Hermite and Falkland Islands, and J. Hooker *O. pectinatus* from Lord Auckland's Group, Campbell's Island, and New Zealand. Thus it appears that all these islands possess only an isolated representant of the genus.

180. Carpha *nivicola*, F. Muell.; rhizome creeping; stem very short, smooth; leaves and lower bracts broad-linear, blunt, with scabrous margin, flat towards the summit; spikelets one-flowered, fasciculate, greatly surpassed in length by the leaves; scales of the spikelets generally five, unequal, the outer ones twice or three times shorter than the rest; the innermost solitary, linear-setaceous, teethless, or wanting; bristles of the perigynium six, nearly to the top plumose, three times longer than the caryopsis; stamens three; style filiform, puberulous; stigmas three, capillary; caryopsis oblong-triangular.

HAB. On the highest summits of the Australian Alps, near swamps.

Closely allied to *C. alpina*. As a genus, I consider *Carpha* as near allied to *Oreobolus* as to *Cyathochæte*, *Rhynchospora*, or *Chætospora*.

LI. GRAMINEÆ.

181. Ehrharta *uniglumis* (Sect. *Tetrarrhena*), F. Muell.; stems branched, with the vaginæ and leaves scabrous, otherwise smooth; spikelets glabrous, distinct; perianth nerved, blunt; gemmella of the lower sterile flower a little longer than the solitary glume, and as long as the hermaphrodite flower.

HAB. In humid valleys on the Brodribb River.

It bears the greatest resemblance to *Ehrharta* (*Tetrarrhena*) *contexta*, but differs from this in the equal length of the sterile flowers, and from all others in the want of the outer glume.

Account of the GUNYANG:* *a New indigenous Fruit of* Victoria; *by* Dr. FREDERICK MUELLER, Government Botanist for the Colony of Victoria.

The number of fruits indigenous in this Colony is so limited, that any addition to them cannot fail to attract a far more general attention than even the most important discoveries in the medicinal properties of our plants, or in their geographical distribution or affinity likely would secure. With this view I selected from a series of new plants, which were obtained during my last journey through the eastern parts of this Colony, the "Gunyang," for an early publication. That the natives apply a special name to this production of our Flora warrants its usefulness in their nomadic life; and as, in fact, the Gipps' Land tribes collect this fruit eagerly, and as probably cultivation will improve it so much as to render the plant acceptable for our gardens, I hope to be excused in not having chosen a more valuable object for a special paper.

The Gunyang bush is a kind of *Solanum* or Nightshade, and has much the appearance of *S. aviculare* (S. laciniatum, *Ait.*),† to which

* *Solanum vescum*, Muell. See p. 165 of this volume.

† The Kangaroo Apple of the Colonists.

species it is indeed in habit so closely allied, that superficial observers, seeing these plants growing promiscuously, will hardly become aware of their distinction. Yet the differences between them are, through all stages of development in both plants, so clear and so decisive, that I do not hesitate to add to the enormous number of more than 900 *Solana*, hitherto described, the Gunyang, as new under the name of *S. vescum*.

It differs from *S. aviculare* in its green but not dark purplish twigs, its sessile, decurrent, somewhat scabrous, and less shining leaves, whilst those of *S. aviculare* are distinctly petiolate, and, consequently, not decurrent along the twigs; in its more tender corollas, which are very slightly, but not to the middle, five-cleft, and hardly ever outside whitish, its thinner styles and filaments, the latter not shorter than the anthers, its more acute teeth of the calyx, its almost spherical, transparently green berries with large seeds: the berries of *S. aviculare* are, on the contrary, at all times exactly egg-shaped, of an orange colour, and with seeds but half as large as in *S. vescum*. The natives of Gipps' Land, moreover, reject the berries of the former on account of their disagreeable taste. To the Peruvian *S. reclinatum* the affinity of our plant appears yet greater; yet in the careful description which Dunal has furnished of it in De Cand. Prodr. xiii. p. 68, neither the characteristic wings of the twigs are attributed to the Peruvian plant, nor do his remarks on the corolla, which he calls half-five-cleft, on the shorter pedicels and smaller calyx agree with *S. vescum*. A close approach between both is, however, manifested in the length and structure of the filaments, as also in the shape and colour of the berries. From *S. senecioides* and *multifidum*, likewise inhabitants of Peru, our species differs already in the division of the leaves, but bears resemblance to them in the winged twigs.

The Gunyang has been found, as far as I know, only yet in Gipps' Land, where it occurs on sand-ridges around Lake Wellington; on the coast towards the mouth of the Snowy River; on grassy hills at the Tambo, the Nicholson's River, and Clifton's Morass; on the rich, shady banks of the Latrobe River, and near the Buchan River. The occurrence of the plant in such varied localities proves how easily it may be cultivated in any soil. It flowers during the spring, and ripens its fruits towards the end of the summer. The berries only lose their unpleasant acridity after they have dropped in full maturity from the

branches, and then their taste resembles in some degree the so-called Cape Gooseberry (*Physalis Peruviana*), to which they are also similar in size.

On the Transplantation of the PERUVIAN BARK-TREE *into* Dutch East India; *by* DR. DE VRIESE.

(*Continued from p.* 312.)

It seemed as if the courageous traveller must encounter new difficulties at the end of his mission. Islay was again in possession of the party of Echenique. An attack for the conquest of Arequipa was preparing there. But the means of transport were wanting. Mr. Hasskarl required many beasts of burden to transport his packages. To obtain these there was no sort of prospect. It was feared, and, as it appeared later, not without reason, that the animals would be seized. The profits of the expedition were not an equivalent to the risk the drivers feared they should incur. The party of Castilla, which was uppermost in Arequipa, moreover, did not permit the departure to Islay, and the one danger brought on the other. At last, when damages for the possible loss of the beasts was promised in case of need, and some persons of influence in Arequipa placed themselves in the breach for Mr. Hasskarl, his desired departure was allowed. On the journey to Islay nothing important happened, but at that place however the beasts were immediately pressed into the military transport service. The Wardian cases were arrived at Islay, but the frigate did not appear till a fortnight afterwards; this induced him to depart for Callao on a vessel going thither in ballast. In three days he arrived there. On the passage Mr. Hasskarl unpacked his Quinquina plants, which he was able to do without interruption. He had reason to congratulate himself on their state, though they had been for more than four weeks shut up from light and air, when cutting through the stems a fresh colour appeared. He immediately planted them in convenient cases. On the 7th of August, late in the evening, he arrived at Callao, and on the 27th he was ready to set out for Java, having passed the interval at Lima.

As soon as the cooler west coast of South America was left, the heat began to increase daily, so that during the greater part of the day the thermometer marked 80° to 86° Fahrenheit. This made Mr. Hasskarl

very careful of his plants, which, from his observations, have in their natural position a temperature not above 60°, and generally below 50° Fahrenheit, and sometimes even at freezing-point. The objects had much to suffer in this heat, which must have been injurious to them, since they had made, including the transport from Bolivia, a land journey of six weeks. Shades of tents, etc., might ward off the sun's rays, but the glass cases were daily obscured with steam inside. The cases were opened, to clear away the mildew that had collected in them; and it was found good to repeat the operation daily. The mildew was continually renewed, and had to be taken away. At the beginning of the voyage, and after leaving the Sandwich Islands, the cases were inspected, and those that required water were supplied with it, however very sparingly.

The stronger plants only began in any degree to sprout; the others showed no signs of doing so, although the stems evidently retained life. Some of them during the voyage began to shoot out at the root, whereas of the weaker plants, the parts above the soil appeared to be dying off, although it was apparently to be expected that they would shoot later. It was thought advisable not to endanger the plants by an untimely inspection, or loosening of the soil.

We were informed, under date of the 22nd of December, 1854, that Mr. Hasskarl had arrived at Batavia on the 13th of that month, with twenty cases containing Quinquina plants, and at the same time, that a longer delay at Callao was caused by the difficulty of obtaining provisions and fuel; further, that at about 150 leagues from the Philippine Islands, the ship had encountered a dreadful hurricane, and had suffered much damage. They arrived at Macassar on the 3rd of December. As a long voyage now was considered bad for the plants, Mr. Hasskarl took his collection on board a steamship stationed there, and arrived at Batavia on the 13th, as mentioned.

Measures were immediately taken by the Governor-General to transport the plants to the higher-situated Tjipannas, in which however a delay of two days was occasioned by the tempestuous weather.

Mr. Hasskarl, on his arrival, was charged with the cultivation of the Quinquina at Java.

We have mentioned some seeds sent by Mr. Hasskarl to the Netherlands. The consequences thereof are to be considered as resulting directly from the mission carried out by that gentleman, and what is to be said of them will find an appropriate place here.

Seeds of various sorts of Quinquina have successively been received at the Colonial office as follows:—

1. *Cinchona Condaminea*, Lamb., var. δ, *lancifolia*, Wedd. (*C. lancifolia*, Mutis), collected in New Granada, and presented to His Majesty's Consul-General there, Mr. Lansberge, by the famous traveller Karstens. From these seeds a few plants have been raised in the Academical Garden at Leyden. From Mr. Hasskarl were received—

2. *Cinchona amygdalifolia*, Wedd. Sent immediately to Java per Overland Mail.

3. *Cinchona Calisaya*, Wedd., from the Valley of Sandia, in the province of Carabaya, in Peru. Of this sort a quantity was sent, immediately on its arrival, by post to Java; another quantity was sown in the Botanical Garden.

4. *Cinchona Calisaya*, Wedd., var. β, *Josephinæ;* sown, but come up badly in the Garden at Leyden.

5. *Cinchona ovata*, R. et P. (*Cascarilla crispilla, rhiqua* or *chiqua*. We were informed that this, like No. 4, grows as a shrub in the neighbourhood of Hohubamba (Peru), 5–6000 Paris feet, on sunny slopes; whereas No. 5 grows at 6–7000 feet in high woods, and even on slopes in a mouldy soil, more or less mixed with mica-slate, which circumstances were taken into consideration in laying the seed to germinate, and in the raising of the plant.

The seeds received (with the exception of those sent directly to Java) were immediately distributed by the Minister for the Colonies to the Directors of the Botanical Gardens of the Universities and of Amsterdam, to be germinated, and further cultivated. It will be unnecessary to mention that these directors, deeply impressed with the importance of the matter, used every effort to make these objects answer the views of the Minister. In the beginning of 1854, and since, in 1855, his Excellency, even a short time after the sowing, received from the Botanical Gardens favourable reports concerning the germination.

With reference to the seeds that the Minister sent by the Overland Mail to Java, to be sown, favourable advices have been received from the Governor-General (see lower); which last circumstance induced the Minister to request the return of the seeds from the Gardens in the Netherlands, and to send them likewise by Overland Mail to East India. It will be readily seen that the Minister, in trying and promoting the matter by all the means in his power, has had no other aim than that

of assuring himself of the success of the intended transplanting. The Quinquina plants raised in the Gardens progressed in their development so much, that even in 1854 some were sent to Java. This really took place, and they were sent from Leyden, Utrecht, and Amsterdam.

1. From Leyden, plants of *Cinchona Calisaya.*

2. From Utrecht, plants of the *Cinchona ovata.*

3. From Amsterdam, plants of *Cinchona Calisaya* and *Cinchona pubescens.*

Of No. 1 favourable reports have been received; of No. 2 such are still expected.

Could there possibly be a doubt as to the correctness of the naming of the sorts of those received from Mr. Hasskarl under the name of "*Cinchona Calisaya,* Wedd."? I think not. The Government had sent a thoroughly competent person, and one who, by a long experience in the investigation of nature, had become a clever botanist, and whose writings testify to his strict exactness and scrupulous nicety in the smallest particulars; his love of truth is above all praise; his special knowledge of the subject must be a guarantee against all mistake. With such security for my conviction, I thought to be able, *à priori,* to foresee, that from the seeds which the Government has been pleased to entrust to the Botanical Gardens, if they germinated, no other plants than the Calisaya Quinine-tree would appear, under which name I received them.

The result has not disappointed the expectation. The Quinquinas here developed are *Calisaya* plants. A strict inquiry has proved this to me as certainly as science only can.

Under date of the 21st of October, 1854, the Governor-General informed the Colonial Minister that a great part of the Quinquina plants had attained such a growth that they could be planted out in a regular garden. Later advices concerning the planting out do not inform us of the preservation of the greatest number of the plants which came up from seeds at the Tjibodas, but this was not to be expected; this has nowhere, or never been the case with transplantation. Experience yet teaches us that plants produced from seeds do not always grow up and remain sound.

The result of the culture of the Quinquina, under the direction and care of Mr. Teysmann, as well those obtained from seeds of Mr. Hasskarl, as those sent on former occasions from Leyden and Amsterdam, is as follows:—

In the beginning of the month of November, 1854, Mr. Teysmann went to Tjipannas to prepare the ground for the transplanting of the Quinquina plants there.

The ground which Mr. Teysmann judged proper for the purpose was then covered with heavy wood; this however being prepared, the transplanting began. It was about half a mile above the Garden of Tjibodas, perhaps 300 or 400 feet higher than this place, and consequently 4600 to 4700 feet above the level of the sea. The soil is very mouldy, with a porous, greasy, red subsoil, in which trees of colossal height, mostly 150 feet, with a diameter of four to six feet, thrive luxuriantly, but which however are now cut down. The land lies to the north-west of the deep ravine of Tjibodas, on the slope of the Gedeh Mountains, and offers above, as well as below, good ground for extending the culture, provided that the woods be felled. The climate through the whole year, but particularly in the rainy season, is very damp, and the vegetation is at times wrapped in the clouds.

To these are now to be added the *Calisaya* plants brought directly from Peru by Mr. Hasskarl, those sent by Willink of Amsterdam, those sent and yet to be sent from the Gardens of the University and of Amsterdam, and the plants which at different times have been sent from the Netherlands to East India, besides those which are yet to come up from seeds now there; by which it may be computed that the plantations already made are, or will be in a short time, much more numerous than the success of the culture required.

How well soever we may be convinced that all the care we can desire is given to the plants by Mr. Teysmann, it is not likely that the cultivation can be taken to heart better than by him who, on innumerable occasions, has risked his life in the countries from which he brought the living trees to Java. The observations concerning their growth, and the natural state of the places where they are found, can be applied to the culture at Java. Numerous particulars, which the most curious observer, who has not visited the original places where they grow, would pass by, are here brought to bear by the experience of Mr. Hasskarl. The long residence of that natural philosopher at Java, his acquaintance with the topography of the Island, with the elevations, table-lands, mountains and their slopes, the constitution of the soil, and the comparison of all these with those in the countries where the Quinquina grows; this rich treasury of knowledge and experience, we are of

opinion, enables us to look for success to attempts so well undertaken.

With all that has already been said with regard to the measures taken by the Government, and the direct importation from South America by Mr. Hasskarl, we think it not improper to say a little of what has been done by means of botanical gardens in the Netherlands, and by one private person, Mr. J. Willink, in the cause of this weighty matter, although those endeavours alone would not, in our opinion, have attained the object of the importation.

From the Botanical Garden at Amsterdam the Professor Miquel sent several Quinquina plants to Java. The results of the sending out of a Quinquina-tree to Java in 1847, under the name of *Cinchona alba*, were very favourable. This tree, after having blossomed at Java, was called there *Cascarilla Muzonensis*, Wedd., or *Cinchona Muzonensis*, Gaud. Mr. Teysmann occupied himself with the management of this tree, which is a shrub, and quickly obtained from it more than a hundred plants.

To promote the chemical investigation of this sort of Quinquina, a few branches were sent to Mr. Rost van Tonningen, then apothecary at the Government Laboratory at Batavia; an analysis which, on account of the small quantity of bark, was not easy. There was no Quinine in it, but a resin which unmistakably had the smell of Quinquina resin, and deserved further inquiry as soon as a larger quantity of the bark should be obtained. He determined to make a second analysis, when the trees should be older, and he should have a larger quantity of the bark.*

We remark here, that till now it is not known at what period the alkaloids develope themselves; and we may expect that a further analysis of the bark of this sort, furnished by the justly-celebrated Botanical Garden of Amsterdam to Dutch East India, will afford us a new subject of information. We may not omit to mention that, for our chemists in Dutch East India, a new field of inquiry is opening, which may be of great importance to the very difficult, and as yet imperfect, chemical history of Quinquina barks.

From the Botanical Garden at Amsterdam, besides the exports made by order of the Minister, plants of *Cinchona Calisaya* were successively

* The result of the inquiry of Mr. Rost van Tonningen was published in the Nat. Tydschrift (Batavia, 1852).

sent to East India,—as, in April, 1851, six plants; December, 1851, three plants; July, 1852, four plants. Mr. Willink, of Amsterdam, has also sent once or twice to Java, and thereby has shown his real interest in the good cause.

In the Botanical Garden at Paris some plants of the *Cinchona Calisaya* had grown up from seeds, sent by Mr. Weddell from South America; part of these were sent to Algiers, the rest were kept at Paris. In 1851 I saw two plants in one of the greenhouses, which, I was assured, were the only ones left. These, as I guess, were from 2–2½ feet high, and were in a healthy state. It would have been indiscreet to have asked for one of those two plants; I learned however that there was one at Messrs. Thibaut and Ketelière's, which seemed to me the same. This plant was conceded to me, and was sent from Paris to Leyden on the 21st of July, 1851. It grew luxuriantly here, and in a few weeks attained a length of 75 inches; it was sent by the Minister's orders, in an apparatus expressly made for it, to Java, on the 1st of December, 1851.

A letter from Batavia, 21st April, 1852, informed me that what I had sent had succeeded; for which, it appeared, that the minute care and the particular form of the apparatus were to be thanked. A few slips were immediately taken from this little tree; and the preservation of the plant was ensured, if unfortunately the chief stem should wither, for which, at first, there was some fear. The slips grew, and the tree also was preserved, to which its transplantation to Tjipannas certainly contributed.

The last advices from East India, concerning this plant, sent from the Botanical Garden, stated that very favourable expectations were formed of it, and that it had already attained a height of 5½ feet. Will the cultivation at Java succeed? Will the soil, the air, the light, the degree of warmth, of dampness, and other atmospheric relations, lastly, will the particular situation, suit the culture? Will the plant there find, in a word, all that it finds in its native soil that is necessary for its development in its normal state, and there everything to form all that which makes it the most valuable of all medicinal substances that the earth anywhere affords?

Of no new agricultural undertaking is the result to be considered as certain. The whole system of agriculture consists but in the exchange or transplantation of plants from one *place* to another. This

holds good for the agriculture of all Europe, and we may say the same (as far as we are acquainted with them) for the other parts of the world; but this is particularly the case with the culture in tropical districts, and with European civilization in other parts of the world. The numberless host of crops of economical or technical nature belong, rarely, or never, by nature, to the lands in which we see them raised.* But those cultivated plants are just the most useful of the whole earth. We seek and find at last, without difficulty, all the circumstances that they require, if the plants are not wholly unfit for the change of air and soil, which quickly appears. Many plants for the commerce of Java, whose porduce, that of some at least, brings large sums annually to the treasury, are not indigenous to that beautiful country, but have been brought to it from elsewhere,—Coffees from Arabia, indigo from Southern Africa, cinnamon from Ceylon, vanilla and nopal from Mexico, tobacco from America, rice from China and Japan, etc. Of some others the origin is no longer to be known. Other plants were originally there, but specimens of them have also been imported from other places, and they all succeed excellently. To expose all this in detail would be to communicate things already known.†

The Island of Java must be considered as having not high alone, but also low temperature, and different climates, even if it be not known by experience. On one and the same island grow cocoa-palms and species of oak; from its plains to the different elevations are found all the varieties of vegetation which are met with, from the equator to the temperate zones. The plains of Java furnish the tropical flora in

* Von Humboldt (and we cannot produce a greater authority) says in his Essay 'Sur la Géographie des Plantes,' p. 27: "L'homme, inquiet et laborieux, en parcourant les diverses parties du monde, a forcé un certain nombre de végétaux d'habiter tous les climats et toutes les hauteurs; mais cet empire exercé sur ces êtres organisés n'a point dénaturé leur nature primitive. La pomme-de-terre, cultivée à Chili à trois mille six cents mètres de hauteur, porte la même fleur que celle que l'on a introduite dans les plaines de la Sibérie. L'orge qui nourrissait les chevaux d'Achille était sans doute la même que nous semons aujourd'hui. Les formes caractéristiques des végétaux et des animaux, que présente la surface actuelle du globe, ne paraissent avoir subi aucun changement depuis les époques les plus reculées," etc.

† Humboldt says (p. 27), "C'est ainsi que l'homme change à son gré la surface du globe et rassemble autour de lui les plantes des climats les plus éloignés. Dans les colonies Européennes des deux Indes un petit terrain cultivé présente le café de l'Arabie, la canne à sucre de la Chine, l'indigo de l'Afrique et une foule d'autres végétaux qui appartient aux deux hémisphères." Others think indigo an Indian plant, although from the different information and opinions we may deduce that the matter is uncertain.—See Roxb Fl. Ind. iii. 379; Wight and Arn. Prodr. p. 202; Royle, Ill. Himal. t. 195; Alph. de Candolle, Geogr. Bot. ii. 854.

all its varieties; and the heights, table-lands, and mountain-tops, the floras of Southern and Middle Europe. The plains of Europe present many floras agreeing with that of the Java mountain-tops, which are 9000 feet higher.

The progress of our knowledge of the geographical propagation of plants, and of that propagation in connection with the knowledge of the physical constitution of countries, offer a vast field for enterprise in the culture and transplantation of plants, which may sometimes be brought from distances of thousands of miles.

The situation of many of the Quinquina districts being analogous to the geographical breadth of Java, must not be lost sight of. If this island does not present a like temperature in respect to the division of the quantity of sunlight, that mighty spur to vegetation, it will however give some analogy.

There exists at Java a principal requisite, which is of the greatest importance, and which almost warrants success. It is this: a good result to the transplantation of the Quinquina-tree from its native soil to a foreign land, can only be expected if (except conditions of less weight) one principal condition be fulfilled, namely that the trees be not planted in any country beyond the tropics; as only in the tropics does a temperature sufficiently even and unvarying last during the whole year, and by which the free development of the Quinquina-tree is made dependent by nature, as it appears in the geographical extent of those trees in Bolivia, Peru, Ecuador, New Granada. For this reason, the countries without the tropics, as Algiers or the Himalaya Mountains, could never serve for the culture of the Quinquina-tree, because they lie without the tropics, and the difference in the temperature of winter and summer is too great to suppose that trees that have been used to an even temperature through the whole year, would thrive there. Similar elevations, with a climate constituted as nearly as possible alike, having the same variations by day and night, are to be found. On the mountains of Java, floras similar to those of the Quinquina-woods of Peru, may indicate the way, the place, the soil probably, where the Quinquina may be cultivated with good success.

In the opinion of Dr. Junghuhn, the elevation for the culture of the Quinquina is to be found at 5000 and 6000 feet, or even higher, particularly as we can with confidence assert that, in America, experience has taught us that those sorts which are met with in the lower stations

produce less Quinine, and are used by the Cascarilleros only to mix with the better barks.

The experience at first acquired should plead for the correctness of the assertion of many Dutch naturalists, who have frequently raised their voices in this important cause, and for the merited confidence which was reposed in their opinions by the present Minister for the Colonies, M. Charles Pahud, under whose direction, doubtless to his own satisfaction, this matter was begun and has been so far successfully carried out; indeed the culture is already begun, as we think we have established in this communication; but particularly by advices from Java, by which we are informed that the culture of the Quinquina is so far advanced that they are of opinion that it is *impossible for it to fail.* These foreign plants have been so acclimated, multiplied, raised from seeds, planted out, and all with such good success, that the Quinquina plantation is reported as being in a very flourishing state.

We are convinced that unless great and not to be foreseen calamities befall them, we shall in a few years see Quinquina plantations at Java yielding the best sorts of Peru and Bolivia. The number of trees which may be raised in a few years is incalculable; but if we take for the basis of our calculation, the fact that a small tree, which arrived at Java three years ago, is now five feet and a half high, and has given off sixty striplings, then, in a few years, by a proportionate continuation of the culture, the number of trees will be increased to millions.

Thus we have succeeded in carrying out a matter in which the whole human race has an incalculable interest, and which was undertaken, not for the Netherlands alone, from thirst for gain or commercial speculations, but for the real benefit of mankind. We flatter ourselves that the Netherlands, on this account, may reckon on the approbation of the whole civilized world.

BOTANICAL INFORMATION.

Cuba Bast *in* Jamaica.

Cuba Bast has been long known as a peculiar fibrous substance, exhibiting a most delicate yet lace-like character, used for tying up bundles of Havannah cigars, and more recently as a substitute for Russian Bast

(the inner bark of the common Lime-tree) for tying up plants; but as to its origin, or the plant or tree that yields this beautiful commercial substance, we have hitherto been much in the dark, as we were a few years ago with regard to the so-called "Rice-paper" of the Chinese. We have corresponded with merchants in Havannah on the subject; we have searched in vain in books, especially in the 'Histoire Botanique de l'Ile de Cuba' of M. Ramon de Sagra, Directeur du Jardin Botanique de l'Ile de Havane, etc.; and we have made personal application to this gentleman; but all in vain: we could gain no information whatever, to be depended upon.

At length, a valued and intelligent friend of ours, Henry Christy, Esq., during a short sojourn in Havannah, made the needful inquiries respecting this Bast, and one or two other products of botanical or commercial interest, the result of which we have recorded in our Notes upon the Vegetable Products of the Great Paris Exhibition, which will appear shortly in the published Reports, and from which we make the following extract, under the head of the "Spanish Possessions or Colonies." These we said "to be miserably represented, Porto Rico only exhibiting a few unnamed *indigenous woods*, samples of Gum Elemi, and fibre of Banana, Maguey, and Ananas. Cuba ranks a little higher; but its productions here exhibited are almost exclusively manufactured articles, and, as might be expected, chiefly Tobaccos and Cigars. We searched in vain for specimens or information relating to the little-known Pine which gives name to the 'Isla de Pinos,' or the celebrated wood called 'Sabicu.' The origin of this wood is still a vexed question; Don Ramon de Sagra attributing it to the *Acacia formosa* of Humboldt and Kunth; Mr. Bentham, to a new species of *Lysiloma*, viz. *L. Sabicu*, Benth. 'Son bois,' says M. de Sagra, 'est dur et d'un usage très répandu; on en fait des soulives ou des planchers; on l'emploie également dans certains ouvrages de charronage, par exemple dans la construction des charrettes.' This has been a great article of trade with the Cubanites; and no less so is a very beautiful substance familiar to us under the name of Cuba Bast, and long known as the material used for binding the Havannah cigars into bundles. It is a kind of Lace-bark, and of the same nature, being the inner layers of the bark of a tree, almost as delicate, and even more silky than the well-known Lace-bark of Jamaica (*Lagetta lintearia*). Of late years, it would seem, the merchants of Cuba can turn it to better account; it has been found by gardeners and

nurserymen equally fitted for tying up plants, etc. as the Lime-tree bark or Bast from Russia, and has been largely substituted for it; and it is imported in bundles, and may be often seen at the shop-windows of nursery and seedsmen in London on sale.

"All these three objects, information respecting which the Spaniards withhold from us, have been recently investigated by a scientific friend of mine, a casual visitor to Cuba, Henry Christy, Esq. Branches with cones of the *Pine* have been communicated by him during the present year (April, 1855), and prove it to be identical with, or very closely allied to, the North American *Pinus resinosa*, Soland., of which Cuba may be considered the southern limit, as Lake St. John, Canada, is the northern. Its leaves are longer than in the continental *P. resinosa*, but in other respects they, as well as the cones, seem to be identical. I possess specimens from New Orleans, so that this species has a most extensive range. Specimens of *Sabicu*, again, sent at the same time, prove that Mr. Bentham's views, expressed in the 'Kew Garden Miscellany,' vol. v. p. 236, are correct (it is *Lysiloma Sabicu*); while specimens and seed-vessels, from which young plants are raised at Kew, show the *Cuba Bast* to be a Malvaceous plant, the *Paritium elatum*, Rich. (Hibiscus elatus, *Sw.*), a tree scarcely to be distinguished from the *P. tiliaceum*, St. Hil."

The fact of the plant yielding Cuba Bast being the *Hibiscus* (or *Paritium*) *elatus*, is further confirmed by seeds sent to, and reared also at, Kew, from a resident in the Island, Mr. Scharfenberg. It is worthy of note that this *Hibiscus elatus* (a very near ally of *H. tiliaceus*, L.) had been, till lately, known as a native of Jamaica only; but it is correctly introduced, with a very good description, into the 'Flora of Cuba' of Don Ramon de Sagra (vol. i. p. 146), without a word being said relative to the properties or uses of it. Thus the *Bast* is known as a product of the Island, and the *Hibiscus elatus*, Sw., is acknowledged to be an inhabitant of the Island; but the connection between the two was unknown.

Recently (September, 1856), among an interesting series of vegetable fibrous substances, collected and prepared by Mr. Wilson,* of the

* We have had occasion, in our Report on the Jamaica Collection of the Great Paris Exposition, 1855, to notice the valuable services of Mr. Wilson, rendered to Jamaica and to the commercial world generally, by his collections of the vegetable fibres, and by the accurate nomenclature of the plants yielding them.

Botanic Garden, Bath, Jamaica, I was agreeably surprised to find one kind so exactly corresponding with the Bast of Cuba, that I had but to place the two side by side to prove that they were identical; and still more was I gratified to find this Bast ticketed as the produce of "*Hibiscus elatus*, Linn."! Mr. Wilson however is not yet aware that he has here detected the *Bast of Cuba*. Such however it is; and, if really of commercial value, of which mercantile men are the judges, Jamaica in its present sunken state, might derive advantage from collecting and exporting this substance. Lunan ('Hortus Jamaicensis,' vol. i. p. 468) speaks of the *Hibiscus elatus*, under the name of *Mahoe* or *Mountain Mahoe*, as a large tree, having been found sometimes sixty feet high and eight in circumference, and frequent in woods. "In some places it is known by the name of *Tulip-tree*. It is accounted a good timber, and the bark makes excellent ropes." Macfadyen (Flora of Jamaica, vol. i. p. 69) further adds, that the timber of this tree is much prized by cabinet-makers, having, when worked up and polished, the appearance of dark-green variegated marble.

An intelligent officer of the Custom House informs me that the price put upon the Cuba Bast, by the mercantile gentlemen who import it, approaches the rate of 2*s.* 6*d.* per lb., and there is a duty of between 10*d.* and 1*s.* per lb.; so that there is no wonder that the imports of this article are diminishing instead of increasing. It would be strange if Jamaica, with an unlimited amount of the tree producing it, cannot afford to supply the English market at a much lower rate; and it is to be presumed the duty would be avoided in coming from one of our own Colonies.

Jersey Cabbages.

Jersey is celebrated for its Cabbages, and for their tall, tree-like character, a peculiarity partly owing to the custom of the peasantry in removing lower leaves—almost daily—to feed their cows. Thus a cabbage-garden in Jersey has somewhat the appearance of a little grove of Palms; so that in walking between them you literally walk under their foliage, which forms a crown at the top; and such stems are not unfrequently ten and twelve, and more, feet long, quite erect, and straight, and are made use of for a great variety of purposes. Planted closely,

as living fences, they keep out fowls and small animals; sheds are thatched with them; they serve as stakes for Kidney-beans, Peas, etc., and the stouter ones as cross-spars for the purpose of upholding the thatch or roof of the smaller classes of farm-buildings, cottages, etc., and, if kept dry, are said to last upwards of half a century. Our friend Mr. Samuel Curtis, a resident in the island, informs us that he has seen a stalk that measured sixteen feet in length, and that one that had grown up under the protection of a cider Apple-tree had its spring shoots at the top occupied by a magpie's nest! The stems are now much used for making walking-sticks ("Jersey Canes"). Stalks eleven feet high, and very good-looking and firm walking-canes, are deposited in the Kew Museum of Economic Botany.

Algerian Plants.

The indefatigable Botanist, M. Bourgeau, writes to us from Paris (Rue St. Claude-au-Marais, n. 14), in a letter dated September 9, as follows:—

"J'ai l'honneur de vous annoncer le retour de mon voyage d'Algérie. Depuis un mois, je suis occupé à faire déterminer ma récolte, et j'ai déjà commencé l'impression des étiquettes. Je crois pouvoir en faire la distribution vers la fin du mois de Novembre prochain. La collection de cette année n'est pas très-nombreuse. Elle sera de 350 espèces environ. Monsieur Kralik, qui a accompagné M. Cosson, a récolté environ cent espèces des plus rares et des plus nouvelles, et elles feront partie de ma collection.

"J'ai, comme d'habitude, un assez grand nombre de plantes intéressantes. Le prochain numéro du Bulletin de la Société Botanique de France vous donnera des renseignemens sur le voyage que je viens de faire.

"J'ai quelques échantillons de bois pour votre Musée et des graines de quelques plantes rares."

Schimper's Plantæ Abyssinicæ, e territorio Agow.

We have had the satisfaction to receive our set of Mr. Schimper's

late collection of Abyssinian plants from the territory of Agow, and we may confidently say that they are well worthy the attention of botanists. The species are many of them new; all are good specimens, and in excellent preservation: they are named, and the special localities given, and they are very reasonable as to price. Our set reckons 210 species, at the price of £2. 17*s*. 7*d*.

They are on sale, together with many other collections from various parts of the world, at Mr. R. F. Hochstetter's, Esslingen, near Stuttgart. Some of those more recent collections are enumerated, with their prices, at p. 284 of our present volume.

NOTICES OF BOOKS.

Hooker, Sir W. J.; Kew Gardens, *or a Popular Guide to the Royal Botanic Gardens of Kew.* Thirteenth Edition. London, 1855. Longman and Co.

Hooker, Sir W. J.; Museum of Economic Botany, *or a Popular Guide to the useful and remarkable Vegetable Products of the Museum of the Royal Gardens of Kew.* Second Edition. London, 1855. Longman and Co.

We have no intention of describing the contents of the two little works here noticed: the object of the Author in preparing them is (to use a familiar expression of the present day) to *popularize* Botany,—in the first in what concerns the living plants of the noble Gardens of Kew, and in the second in what concerns the *products* of the vegetable kingdom, as displayed in the Museum of the same Gardens; with what success some judgment may be formed from the fact, that the *Kew Garden Guide* has, exclusive of spurious and piratical copies, gone through thirteen editions (each of 3000 copies), in the short space of eight years. The *Museum Guide* had the first edition published last year (1855), and the second edition was called for in June of the present year.

Polypodium anomalum

A List of some MOSSES *and* HEPATICÆ, *collected by the* Rev. Charles Parish, *at* Moulmein, *and communicated to* Sir W. J. Hooker; *by* W. MITTEN, ESQ.

(Tab. XII. C.)

MUSCI.

1. Garckea *phascoides*, C. Müller. (Dicranum, *Hook.*)

HAB. On clay-banks. (No. 6.)

2. Leucoloma *Taylori*. (Syrrhopodon, *Schw.*)

HAB. On trees in jungles. (Nos. 10, 19.)

3. Leucoloma *tenerum*, Mitten, MSS.

HAB. Moulmein. (No. 0.)

Closely allied to *L. molle* (Dicranum, *C. Müller*), but differing thus:—plants more slender; leaves not papillose on the back, the margin evidently hyaline about the base of the subulate portion of the leaf, the cells of the middle band more minute and obscure, those of the base, "cellulæ alares," firmer and red-brown. Mr. Parish mentions his having seen the fruit; but it is not present on the specimens sent.

4. Dicranum (Campylopus) *subluteum*, Mitten, MSS.

HAB. Nwa-labo (the Ox's-hump), a mountain near Tavoy.

Habit and general appearance similar to that of *D.* (*C.*) *flexuosum*, but more robust, with leaves suddenly narrowed from an oblong base into a long, subulate point, consisting almost entirely of nerve, smooth behind and slightly denticulate at its apex; the base is composed of firm and uniform cells, the nerve occupying one-third of the whole width; the "cellulæ alares" are small, pale-red, and plane.

In all the species yet received from India with firm cell-structure in the lower part of the leaf, the pagina gradually tapers off towards the point, but in this it is abruptly contracted.

5. Didymodon *flaccidus*. (Weissia, *Harvey*.)

HAB. On the ground in damp places. (No. 4.)

This curious little species is closely allied to *D. sphachnifolius*, Hooker, with which it is certainly congeneric. The mouth of the capsule is remarkably thickened and contracted, so that the short red teeth are nearly horizontal in their direction, a little irregular at their sides, and the medial line scarcely evident. The leaf structure corresponds with that of *D. flexifolius*, but is thinner and more flaccid.

6. Macromitrium *sulcatum*, Brid.

HAB. Moolee, alt. 7000 feet. (No. 24.)

7. Macromitrium *calymperoideum*, sp. nov.; dioicum?, repens, ramis brevibus densifoliosis, foliis madore patentibus siccitate contortis breviter lanceolatis obtusiusculis nervo rufescente carinatis e cellulis subquadratis superne opacioribus sed distinctis papillosis areolatis apice papilloso-crenulatis, perichætialibus imbricatis brevi-lanceolatis acuminatis margine serrulatis, theca in pedunculo subunciali tortili cylindrica lævi, operculo subulato, peristomio e dentibus 16 geminatis pallidis siccitate reflexis, calyptra dense appresso-pilosa capsulam totam longissime superante.

HAB. On a tree near Tavoy. (No. 90.)

Similar to *M. Nepalense*, Schw., in size and habit, but differing in its not spirally-twisted foliage when dry, the uniform sub-hexagonal and larger cell-structure of its leaves, which is distinct in the upper portion, not obscure and opaque, and more evidently papillose. The calyptra in both species closely invests the capsule, and has some resemblance to that of the species of *Calymperes*.

8. Bryum *coronatum*, Schw.

HAB. On old pagodas. (No. 8.)

9. Mnium (Rhizogonium) *spiniforme*, L.

HAB. Nwa-labo. (No. 91.)

10. Fissidens *polypodioides*, Hedw.

HAB. Nwa-labo. (No. 00.)

11. Meteorium *squamosum*. (Neckera, *Hook.*)

HAB. Pendulous from branches of trees in damp jungles, sometimes a foot or more long. (No. 21.)

12. Distichia *exserta*. (Neckera, *Hook.*)

HAB. Damp jungles (?).

13. Omalia *flabellata*, Brid.

HAB. Jungles in the mountains (†).

14. Leptohymenium *julaceum*. (Pterogonium, *Hook.*)

HAB. Fruiting in the rains, August and September. (No. 7.)

15. Hypnum *Tavoyense*, Hook.

HAB. Common on trees. (No. 5.)

16. Hypnum *rostratum*. (Neckera, *Griffith.*)

HAB. In tufts around the joints of bamboos, near the top of Nwa-labo, at an elevation of about 4000 feet. (No. 91.)

This Moss is allied to *Leskia cæspitosa*, Sw.

17. Hypnum *lignicola*, sp. nov.; monoicum, pusillum, laxe cæspitosum ramis simplicibus decumbentibus, foliis patentibus ovatis longe tenuiter subulato-acuminatis enerviis integerrimis cellulis teneris angustis albidis alaribus vix distinctis, perichætialibus subulato-lanceolatis patulis, theca ovali æquali flexura pedunculi gracillimi horizontali, peristomio magno interno ciliis solidis.

HAB. On trees (rotten wood), Moulmein. (No. 12.)

Nearly allied to *H. albescens*, Schw., and to *H. tenerum*, Sw., but with narrower and longer leaves, which are not bifariously appressed. The capsule, contracted below the mouth, is quite equal, and becomes horizontal from the curvature of the slender seta.

18. Hypnum *compressifolium*, sp. nov.; dioicum, ramis elongatis eleganter plumoso-pinnatis planis, foliis patentibus falcatis distiche compressis ovatis acuminatis margine serrulatis nervis binis brevibus, cellulis alaribus obsoletis.

HAB. Moulmein. (No. 26.)

Very closely resembling *H. plumæforme*, Wils., and with it allied to *H. Buitenzorgii*, Mont., but its leaves are much wider, with no trace of the sinuation just above the base. This Moss is common in the Khasia mountains, and seems to be always of a fresh green colour, without a tendency to the golden tint observable in its allies. The branches are three inches long and more, and very much compressed.

19. Hypnum *cymbifolium*, Dzy. et Molk.

HAB. Moulmein. (No. 27.)

20. Hypnum *investe*, sp. nov.; monoicum, caule exili repente nudo, ramis pinnatis, foliis caulinis ovatis, nervo indistincto, rameis ovatis acutis incurvis ramulisque oblongis obtusis marginibus crenulatis papillosis obscuris, nervo pellucido sub apicem evanido, perichætialibus e basi latiuscula subulatis enerviis parce denticulatis, theca minuta horizontali, deoperculata obovata rugulosa subcarnosa, peristomio normali?

HAB. On rocks, Moulmein. (No. 15.)

Very minute, almost byssoid, much smaller than *H. minutulum*, with the leaves of its ramuli and perichætium of a different form. The stems are destitute of paraphylla.

21. Leucobryum *falcatum*, C. Mueller.

HAB. Nwa-labo, at an elevation of 4000 feet.

22. Schistomitrium *Gardnerianum*, Mitten; conferte cæspitosum, caule erecto fastigiatim ramoso, foliis dense imbricatis erecto-patentibus lanceolatis apice obtusiusculis apiculatis, marginibus inflexis, concavis, e basi ad medium tenui hyalino marginatis, perichætialibus paulo latioribus, theca in pedunculo brevissimo minuta foliis perichætialibus immersa hemisphærica cyathiformi gymnostoma, operculo e basi conica longe subulato rostrato, calyptra longissime subulata basi lacera laciniis fimbriatis. (Tab. XII. *C.*)

Hab. On trees, Moulmein. (No. 2.)

Resembling *S. speciosum*, Dzy. et Molk., in size and in the form and structure of its leaves, so closely that the barren plant is scarcely distinguishable. The immersed, cup-shaped, gymnostomate capsule is a new feature amongst the Leucobryaceous Mosses. Mr. Parish states that it grows in tufts like *Grimmia pulvinata*.

This curious Moss was first gathered in Brazil by Gardner, with old fruit, in whose collections it was distributed, mixed with *Leskea cæspitosa*, Sw. (*Hypnum crassiusculum*, No. 94); from this source the barren plant was described by C. Mueller as a doubtful *Leucophomes*, from which genus it recedes not only in leaf-structure but in the calyptra. Specimens with perfect fruit have been gathered by Schlim at Minca, at an elevation of 4000 feet, in the province of St. Martha, New Granada, and distributed by Linden as No. 913.

Tab. XII. *C.* Fig. 1. Plants, *nat. size.* 2. Leaf. 3. Section of ditto. 4. Capsule. 5. Leaf and capsule, with calyptra; *magnified.*

Hepaticæ.

1. Jungermannia *hirtella*, Weber.
   Hab. Moulmein. (No. 26.)
2. Plagiochila *Nepalensis*, Ldbg.
   Hab. Moulmein. (No. 30.)
3. Sendtnera *juniperina*, Nees.
   Hab. Moolee. (No. 31.)
4. Physiotium *sphagnoides*, Hook.
   Hab. Moolee. (No. 22.)
5. Ptychanthus *striatus*, Nees.
   Hab. Damp jungles. (No. 32.)
6. Lejeunia *adplanata*, Nees.
   Hab. On an *Erythrina Magui;* also a smaller state on trees. (No. 29.)

4.
3.
2.
1.

Fitch del. et lith. | Vincent Brooks Imp.

Gnetum paniculatum.

Another species has been sent (No. 28), which appears to be closely allied to, or perhaps identical with, *Phoragmicoma tumida*, N. and M.; but the stems are young and creeping, without any trace of fructification.

Description of Two American Species of GNETUM; *by* GEORGE BENTHAM, Esq.

(With Two Plates, TAB. II. and III.)

But one species of South American *Gnetum* has been hitherto known: the *Thoa urens* of Aublet, first referred to *Gnetum* by Brown, and quoted under the name of *G. urens* by Blume. Mr. Spruce's researches have added two new species, of one of which complete specimens of both sexes have enabled Mr. Fitch to give the accompanying Plates, the dissections having been kindly supplied by Dr. Hooker.

The structure of the flowers, both male and female, is so exactly that of the Asiatic species of this curious genus, that nothing has to be added to the accurate views first propounded by Brown, or to the detailed descriptions or illustrations of Blume, Griffith, C. A. Meyer, and Wight. Of the two coats which immediately enclose the nucleus in the female flower, or the albumen in the fruit, the inner one, in the American as in the Asiatic species, is extended at the apex, after fecundation, into a style-like protruding process; whilst the outer one remains much shorter, and ultimately is little more than an outer scar at the base of the seed, and these coats are universally admitted to belong to the ovulum and seed. As to the third outermost coating of all, which entirely encloses the ovulum and seed, it is at the time of flowering so nearly similar to the envelope which encloses the stamens in the males, and when the seed is ripe so analogous in position and structure to a pericarp, that it is impossible not to concur with Brown and C. A. Meyer in considering it as either of involucral or perigonial origin,—contrary to the opinion emitted by Blume, that it represents the ovarium, or the still less comprehensible theory of Griffith, that it is the real outer membrane of the ovule or testa of the seed.

The following are the characters of Mr. Spruce's two species:—

1. *Gnetum paniculatum*, Spruce, MS.; dioicum, foliis ovatis rarius ellip-

ticis, paniculis axillaribus amplis aphyllis, amentis fasciculatis brevibus, verticillis appproximatis.

Caulis alte scandens, vix digito crassior, nodis intumescentibus. *Folia* breviter petiolata, 4–6-pollicaria, longius breviusve acuminata, basi rotundata coriacea, venis paucis prominulis. *Paniculæ* axillares, oppositæ, nunc fere pedales, opposite ramosissimæ, nunc minores, oligostachyæ. *Amenta* subverticillata, breviter pedicellata, semipollicaria v. vix longiora, constant e florum verticillis 5–8 (vulgo 6), nunc arcte approximatis, nunc inter se semilineam distantibus. *Involucra* sub floribus breviter cupulata, floribus breviora, integerrima v. obsolete biloba (e squamis 2 connatis composita). *Flores masculi* in verticillo numerosi, filamentis articulatis dense confertis immixti. *Stamen* intra squamam clavatam apice truncatam primo inclusum, dein protrusum, apice antheram terminalem bilocularem ferens, loculis rima transversali dehiscentibus. *Amenta fœminea* masculis similia nisi minora et pauciora. *Ovulum* per anthesin intra squamam subglobosam arcte inclusum, acumine styliformi integro post anthesin breviter protruso, demum evanido. "*Drupa* magnitudine et forma ovi columbæ, viridis, purpureo tincta. *Pericarpium* carnosum; endocarpium cartilagineum subfibrosum, a pericarpio facile separandum. *Semen* pericarpio conforme, basi lata affixum, cæterum a pericarpio liberum, testa papyracea. *Albumen* carnosum. *Embryo* intra cavitatem albuminis reversus; radicula longa, filiformis, spiraliter torta et corrugata; cotyledones minutæ" (R. Spruce, *in schedis*).

This appears to be common in the Gapó and Capoeiras of the Upper Rio Negro and its affluents. In the first distribution I had mistaken the female specimens for a distinct species, to which I had given the name of *G. microstachyum;* but a series of specimens since received from other localities show me that the characters I had relied upon in the form of the leaf are liable to great variation. Mr. Spruce gathered the species on the Rio Negro, above Barcellos, in December, 1851; near San Gabriel do Cachoeiras in May, 1852; on the Rio Uaupés in September, 1852; near San Carlos, in September, 1853; and on the Rio Guainia, in June, 1854, It has been distributed under the numbers 1923, 2314, and 2554.

2. *G. venosum*, Spruce, MSS.; dioicum, foliis oblongis ellipticisve, paniculis axillaribus aphyllis, amentis tenuibus elongatis, verticillis longe remotis.

Folia angustiora quam in *G. paniculata*, venis evidentioribus. *Paniculæ* in specimine meo (masculo) parce ramosæ. *Amenta* longinscule pedicellata, bipollicaria vel paullo longiora. *Verticilli* in amento 6–8, inter se 3–4 lineas v. demum semipollicem distantes, paullo majores quam in *G. paniculata*. *Flores* numerosi, iis ejusdem speciei simillimi.

In the Gapó at Managuiry, at the confluence of the Rio Negro and the Solimões, June, 1851 (Spruce, n. 1579).

A specimen from the last expedition into Guiana of the two Schomburgks (Sir Robert Schomburgk, n. 1013, Richard Schomburgk, n. 1737), probably from the neighbourhood of Roraima, is nearly allied to the last, and perhaps a mere variety: the male verticils are larger, and still more remote, and the leaves are more like those of *G. paniculatum*; my specimen is however very imperfect.

Aublet's species is unknown to me: from his figure, it is monœcious, and there are leaflike bracts under the ramifications of the panicle, which I have never observed in either of the two preceding species.

Plate II. *Gnetum paniculatum*, mas. 1. Flowering amentum. 2. Portion of a verticil of flower, vertical section. 3. Male flower. 4. The same, with the involucral scale cut open, and two of the filaments which surround it:—*all magnified.*

Plate III. *Gnetum paniculatum*, fœmineum. 1. Flowering branch, natural size. 2. Amentum. 3. Female flower, enlarged after fecundation, with the protruding styliform process of the inner coat of the ovule. 4. The same, vertical section, showing the nucleus, the two coats of the ovule, and the involucral scale which encloses it. 5. Fruit. 6. Endocarp. 7. Fruit cut open, showing the seed, the endocarp, and pericarp. These however are represented rather too distinct: they form but one coating when young, and are only separable at maturity. 8. Vertical section of the seed, showing the cavity of the albumen in which the embryo lies; the embryo itself, described from fresh specimens by Spruce, was destroyed by insects in the seeds sent home. 3 (in the upper part of the plate). Articulated filaments which surround the flower:—Nos. 2, 3, and 4 *magnified*, the remainder *natural size.*

On Polypodium anomalum, *a new Species of* Fern, *bearing its Sori on the upper side of the Frond; by* Sir W. J. Hooker, K.H., F.R.A. and L.S.

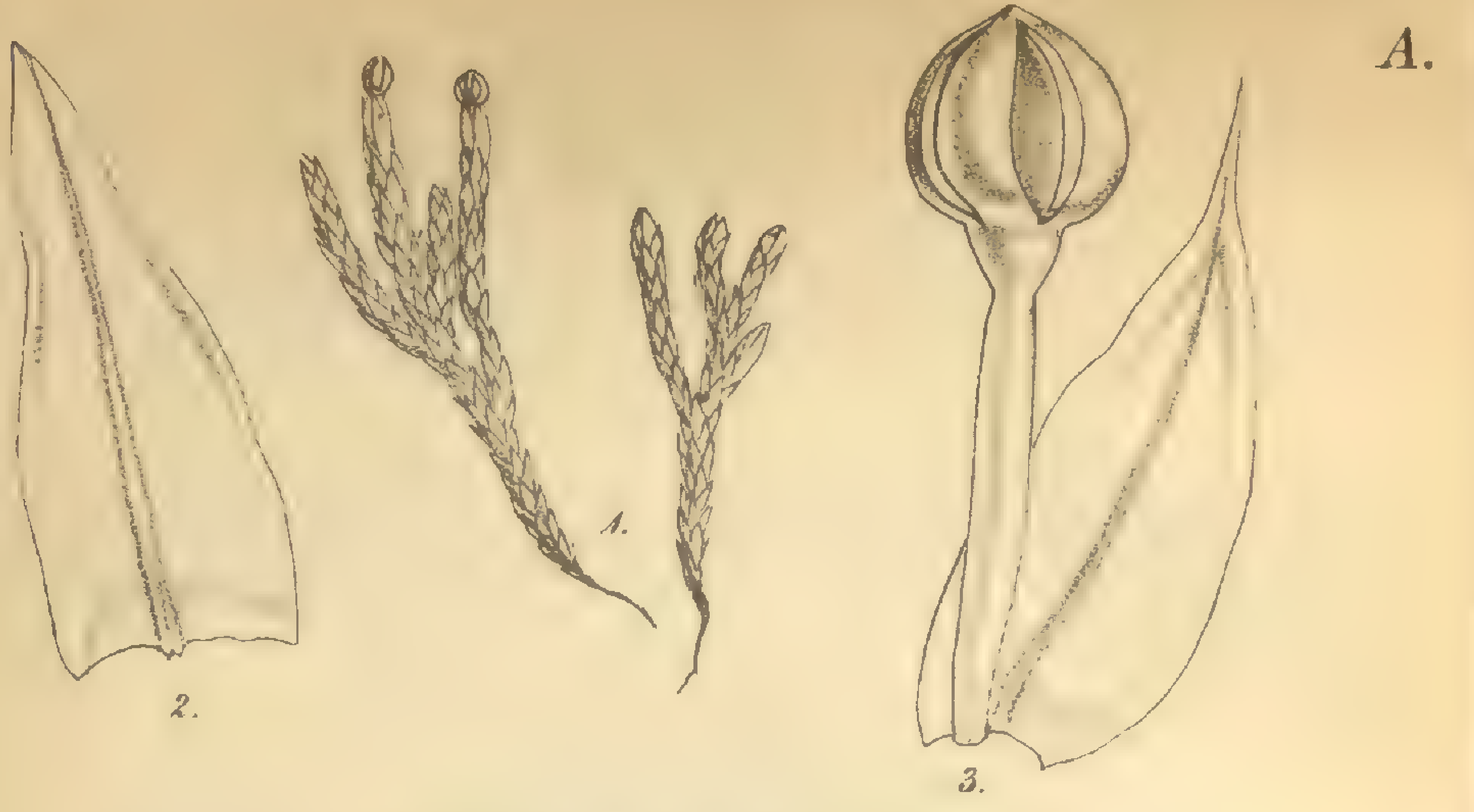
(Tab. XI.)

Polypodium *anomalum;* fronde ampla ovato-lanceolata subcoriacea polystichoidea, bi- rarius inferne subtripinnata, pinnis primariis lanceolato-acuminatis, pinnulis brevi-petiolulatis subfalcatis oblique ovatis ovato-lanceolatisque acutis lobato-pinnatifidis apice grosse serratis lobis acutis (rarius obtusis nunc mucronatis) basi superiore auriculata, soris biserialibus in venulas terminalibus in parte superiore frondis sitis!, stipite rachibusque copiose paleaceo-squamosis.

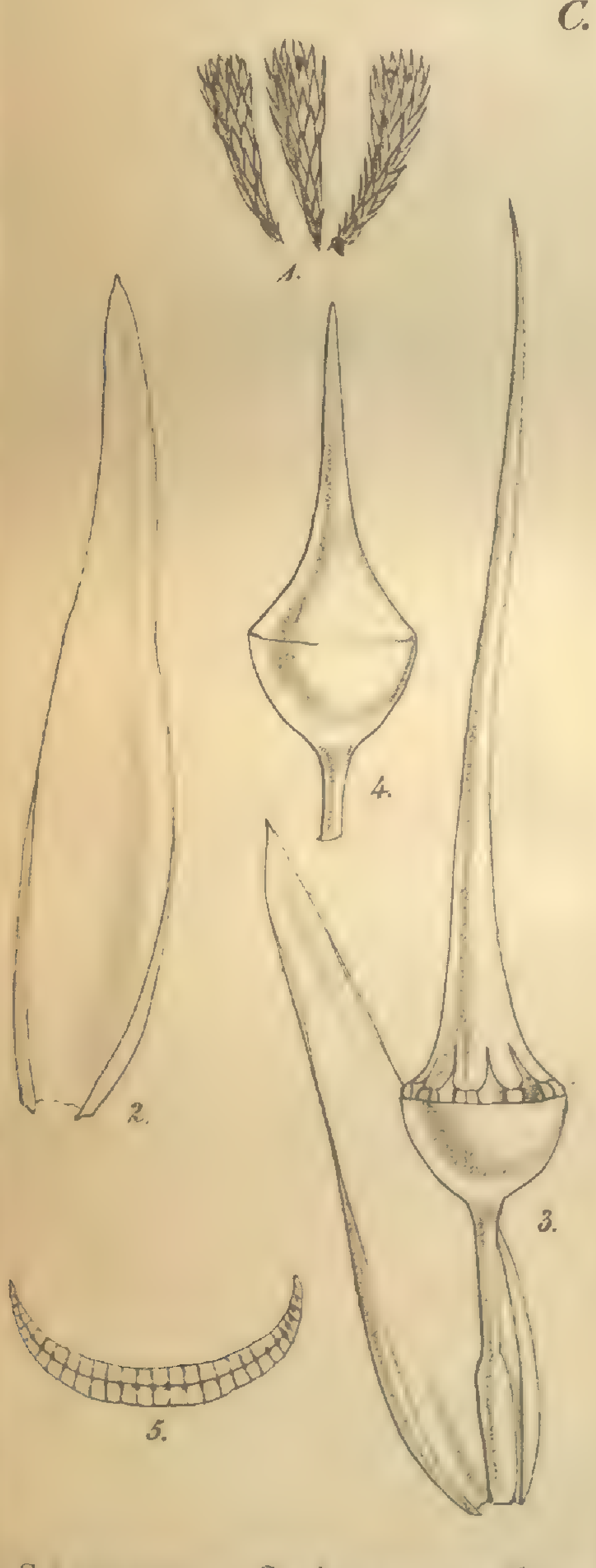
Polypodium anomalum, *Hook. et Arn. MSS.*

Hab. Ceylon, *Mrs. General Walker*, *G. H. K. Thwaites, Esq.*

Descr. An entire *frond* of this plant measures 1½ foot long (exclusive of the stipes, which is 15 inches); in form its outline or circumscription is broad, ovato-lanceolate, acuminate, of a firm, subcoriaceous, but not very thick substance, bi- or rarely below tripinnate, primary *pinnæ* spreading, lanceolate, acuminate, 7–8 inches long, secondary *pinnæ* or *pinnules* shortly petiolulate, obliquely ovate or ovato-lanceolate, subfalcate, cuneate at the base, auricled at the superior base, crenato-lobate, subserrate at the very apex, sometimes on the lower pinnæ they are deeply pinnatifid, and even again pinnate, the lobes usually obtuse, the serratures and the auricle mucronate or obtuse. *Venation* free, somewhat sunk on the upper, a little prominent on the inferior side; each lobe has a forked vein; the *veinlets* not reaching the margin, the superior and soriferous one pointing to the sinus of the lobes and terminating a little more distant from the margin. *Sori* in two rows upon the pinnules, always terminal, and on the *upper or anterior face* (very rarely indeed on the under) subrotund and convex (thence hemispherical), never, even in the youngest state, exhibiting any trace of indusium. *Stipes, rachises, costæ*, and even the under side of the young *fronds* clothed with more or less deciduous, chaffy *scales*, of a rich tawny brown colour; those on the under surface of pinnules are exceedingly minute, distantly scattered and appressed; those on the rachises, especially on the main rachises, are copious, larger, lanceolato-subulate, and spreading; they are most copious and larger on the stipes, and very large and broad, ovate, acuminate towards the lower part of the stipes, but at its very base, when the stipes had been severed from the caudex,



Andræa Australis, *Mitten.*



Schistomitrium Gardenerianum, *Mitten.*

Mnium venustum, *Mitten.*

W. Mitten del. W. Fitch lith.

Vincent Brooks Imp.

the scales are again contracted, subulate, and closely imbricated. So deciduous are the scales sometimes, that we have a specimen with scarcely a trace of one upon them.

Many years ago this anomalous Fern attracted the attention of Dr. Arnott and myself, in the Hookerian Herbarium, when the only specimens we had received were from Mrs. General Walker. Lately we have been favoured with specimens in a letter from our friend Mr. Thwaites, gathered by him in a mountain region in the same island, accompanied by the remark that "the fructification appeared to be on the *superior*, and not, as usual among Ferns, on the under side of the frond." This upper side is at once recognizable by the darker colour, more glossy surface, slight convexity, and still more surely by the furrowed rachis and more or less sunken veins. The plant is here figured rather with a view of directing attention to the fact, than from a conviction of the specimens being otherwise than a *lusus*: nay, were it not that even in the youngest state of the fructifications we find no trace of indusium, I should be disposed to consider it an abnormal form of *Polystichum vestitum*, where, too, the indusium is often early deciduous. It is true that, if viewed in the light of a monstrosity, the absence of an indusium might be accounted for by the supposition that the upper surface of the frond was destitute of that peculiar organization which would give origin to the indusium. Such is not the fact however with a specimen of *Asplenium* lately placed in Dr. Hooker's hands by N. B. Ward, Esq. (*Aspl. Trichomanes*, L.), gathered in Italy by E. W. Cooke, Esq., R.A., which, besides the copious fructification on the under side of the frond, exhibits one pinna bearing a solitary sorus on the disc of the upper side, with its indusium as perfect as any on the under side. Even on one specimen of *our present* plant I have detected, on two or three of the pinnules only of an entire frond, a few sori on the under side, and in one or two instances corresponding with a young sorus on the upper side.

I am aware that some acrostichoid Ferns (*Polybotrya*, for example) are considered to have both paginæ of the pinnules clothed with fructifications, and this is the normal character of the particular species, and where the whole frond, changed in form, becomes fertile; and the *Davallia immersa*, Wall. (Leucostegia, *Pr.*), has been described as bearing the sori on the upper side, but this is in appearance only, for, as Presl well explains it, "Frondis—pagina superiore pallidiore faciem

paginæ inferioris reliquarum Filicacearum præseferente, inferiore intensius viridi nitidiore faciem superiorem referente."

Mr. Thwaites will, we have no doubt, make further observations on the *living* plant, and will probably be able to show satisfactorily whether this is, or is not, an abnormal form of *Polystichum vestitum* (Aspidium vestitum, *Sw.*), a frequent inhabitant of Ceylon.

Tab. XI. Fig. 1. Lower portion of a frond of *Polypodium anomalum*, exhibiting the *superior* or *anterior* side, with its fructifications, *nat. size.* 2. Pinnule, upper side, with fructifications, *magnified.* 3. Pinnule, showing a few sori, which have occasionally been seen on the under side, *magnified.* 4. Lower portion of the stipes, *nat. size.*

Sketch of the Life and Writings of M. de Martius, Secretary to the Bavarian Academy of Science; *by* Alphonse de Candolle.

(*Translated from the* '*Bibliothèque Universelle de Genève*,' *Janvier*, 1856.)

Such periodicals as the present are open to just censure, inasmuch as they frequently give an account of trifling pamphlets and small publications of ephemeral interest, to the neglect of those larger works which exert a prolonged influence upon science. And the cause is obvious; for a pamphlet is quickly analyzed, while years, often a lifetime, is devoted to bringing out, in single numbers, and perhaps chiefly in plates, those costly books which finally stand like statues or triumphal arches, but whose progress is gradual and almost unseen.

This is eminently the case with botanical works, when they consist of long series of descriptive matter, analyses, and plates; and especially if they treat of exotic productions, unknown even in our stoves. The numerous and important works of M. de Martius are a case in point. I never received a number of the 'Flora of Brazil,' or the 'Natural History of Palms,' but I was tempted to record it in the bulletin of the 'Bibliothèque Universelle;' and then I desisted, through a reluctance to weary my readers by narrating details concerning unfinished works, whose merits it would be very difficult to convey in words.

The opportunity is now presented; for the illustrious author has just completed his three great works, and he has marked an important epoch

of his life, by renouncing the functions of public instructor, which he had held for thirty-three years, with the view to devoting all his energies to one single publication, and to the Secretaryship of the Academy. It is natural for his friends and pupils, and for all those botanists who have benefited by his labours, to wish to review a career which, though still unfinished, has been meritoriously filled. We owe this homage to one of our guides, whose labours suggest many useful reflections on the present state of European Botany.

Dr. Charles Frederic-Philippe de Martius was born at Erlangen on the 17th of April, 1794. The Latin termination of his name is not an unusual thing in Germany, but is often connected with literary parentage, and with a period when authors wrote everything, even their own names, in the classic tongue: it may be deemed the stamp of intellectual pedigree. Galeottus Martius, a native of Ravenna, was in 1428 the librarian of the famous Hungarian King, Matthias Corvinus, and he was one of the ancestors of our botanist, whose grand-uncle, again, Henry de Martius, published in 1812 a 'Flora of Moscow,' of which the entire first edition, except two copies, was destroyed in the conflagration of Moscow. His father, Ernest William, who died in 1849, at a very advanced age, had been, in conjunction with Hoppe, one of the three founders of the Ratisbon Botanical Society: he wrote a 'Journey in Franconia and Thuringia,' bearing chiefly upon Mineralogy and Natural History; and towards the close of his life he published a volume, entitled 'Souvenirs of a Nonagenarian,' which contains many interesting pictures of social life in Germany during the eighteenth century. Finally, the brother of M. de Martius is Professor of Materia Medica in the University of Erlangen.

The young Philippe de Martius enjoyed the advantage of pursuing the study of Natural History and Medicine in his native town, guided by his father and his father's friends. He was the botanical pupil of Schreber, who had studied under Linnæus. To the latter circumstance may be in a measure due the clearness of his descriptions, his correct notions on the nature of genera and species, and his generalizing turn of mind. From an early age there was no branch of knowledge which he did not seek to acquire; Zoology under Goldfuss, Chemistry under Hildebrand, Philology under Harless, Philosophy under Mehmes and Vogel; he studied all with attention, or rather with enthusiasm, for he had as strong a bent for arts and literature as for positive science. The

philosophy of Kant and Schelling, then in vogue in Germany, served to combine these opposite tendencies; and to seek imaginary things in realities, and *vice versâ*, was the most fascinating occupation of the young. The German Universities took their full share of these speculations, in 1812 to 1816; and though disgraced by a Sand, it must be asserted that the majority of the pupils were inspired with an honest and disinterested patriotic zeal, and that arts, science, and literature received a powerful impulse at that period. Like their own majestic Rhine, the Germans pursued their course: the troubled and tumultuous mountain-stream works itself clear, strong, and broad, as it flows along the level plain.

M. de Martius had by no means gone all lengths in these juvenile ebullitions: his zeal for study, the influence of his worthy friends, and other soberizing circumstances availed, and soon he had the exciting prospect of making a distant expedition into the New World. During his Erlangen career, Theodore Nees von Esenbeck, younger brother of the President of the Natural History Society, was his most intimate acquaintance: they worked together, and when separated, they carried on a Latin correspondence. Theodore was a remarkably amiable and well-informed man, a close observer, and one whose works, especially the earlier portion of the 'Genera Plantarum Floræ Germanicæ,' are deservedly esteemed. He and Martius often spent many weeks at Wurzburg, in the house of the elder Von Esenbeck, studying botany, science, and philosophy.

At the death of Schreber, the Bavarian Academy purchased his collections, and sent the aged Professor Schrank to Erlangen, to receive them and bring them away. The latter had noticed young Martius' remarkable intelligence, and held out some hope of his obtaining employment at Munich; a prospect which was eagerly seized, for after passing very strict examinations, he became a pupil of the Academy, and in 1816 he was appointed to a charge in the Botanic Garden.

The first of his publications were a 'Catalogue of the Plants in the Erlangen Garden,' and a 'Cryptogamic Flora of the Environs.' As may be supposed, these little works were marked by no novelty; materials for which were in fact wanting. War had closed all communication with foreign countries; and herbaria of exotic plants were few and poor, and had already been worked out by the botanists to whom they belonged. True that the 'Travels of Humboldt,' and the brilliant dis-

coveries, condensed in Mr. Robert Brown's 'Prodromus Floræ Novæ-Hollandiæ,' had excited the greatest attention among naturalists; but an intercepting barrier now arose, and America was become like an Atlantis, or like an antediluvian world, only known by scattered fragments. Peace was the grand desideratum; and when it was granted, M. de Martius stepped forward as the second discoverer of the New World's vegetation.

The King of Bavaria, Maximilian the First, often walked as a private amateur in the Munich Botanic Garden, where he observed young De Martius, who performed the functions of Director, determining the plants and superintending the workmen, tasks which Dr. Schrank's great age no longer allowed him to do. The Monarch had seen the marvellous vegetation of the Spanish Colonies, and took great interest in plants; and when, shortly after, the Congress of Vienna arranged the marriage of an Austrian Princess to the Emperor of Brazil, and the Austrian Government contemplated sending a committee of *savans* with the embassy, and Maximilian proposed to appoint two Bavarian naturalists, Spix as zoologist and Martius as botanist, gladly did the latter accede. The arrangements were promptly made. A young monarch's desire to receive his bride forbade all lingering delay: a few weeks settled the affair, and our naturalists, who accepted the proffered employment in February, 1817, had embarked on the 10th of April at Trieste, in the Austrian frigate which bore away the future Empress. It might have been well that books and scientific apparatus were more amply provided, and then the transition from the chilly plains of Bavaria to the glowing mountains of Rio Janeiro, covered with virgin forests, and rich in tropical *Orchideæ*, must have made all the more powerful impression upon youthful and unprepared minds. What a contrast, from humble Mosses and dingy Lichens to glorious and stately Palms! We owe much to the memory of the King, who had found an observer so worthy to comprehend and so competent to describe the beauty and magnificence of Brazilian vegetation.

The plan of the expedition was traced by the Bavarian Academy. It was in accordance with the amount of their knowledge of South America. Hardly a naturalist had visited that vast region since Pison and Marcgraf: its interior was almost untrodden; consequently the idea was to send the travellers over the greatest possible range of country, superficially of course; whereas now a directly opposite plan would

be pursued, and the thorough investigation of one province would be deemed the worthier object. In fact, a voyage of discovery, like that of M. de Humboldt in another part of the American continent, was the errand on which our naturalists were bound.

The new scientific conquest of Brazil was pursued by the members of the Austrian commission as follows:—Auguste de St. Hilaire and Sellow investigated, separately and in different directions, the southern part of the empire; Pohl, the principal botanist, explored the central region; Langsdorff and Riedel, whose collections belong to the Museum of Petersburg, went from Rio Janeiro to Bahia and the Amazon River; while M. de Martius (now the sole survivor of all these travellers), ranged, with Spix his colleague, over a much wider territory than any of the others; for he first visited the provinces of Rio and St. Paul, and then reached Pernambuco and Bahia, passing through the interior of the country, and enduring numberless difficulties, privations, and dangers. He made a fine harvest in the province of Ilheos, and soon quitted Bahia for a still more extensive journey, across the provinces of Piauhy and Maranham to the Amazon River, which he ascended as far as the confines of Peru.

MM. Spix and Martius happily achieved in three years this immense journey of from 4000 to 4300 miles, through a hitherto unexplored territory: they incurred no serious accident, and brought home their valuable collections in safety. The Museum of Natural History in Munich was enriched by our travellers with the following treasures:—Mammifera, 85 species; Birds, 350 species; Amphibia, 130 species; Fishes, 116 species; Articulata, 2700 species; Arachnidea, 80 species; Crustacea, 80 species; Plants, 6500 species.

The total expense of the expedition amounted to £2400 (30,000 florins), by no means a large sum, considering the extent of the country which was visited, and the number, novelty, and value of the collections.

But valuable collections are trifles, compared with the use which is made of them. The King, the Bavarian Academy, and the travellers themselves, were perfectly aware that it is not enough to pile up new and curious objects in a museum, but that it is chiefly important to study, figure, and publish them.

MM. Spix and Martius hastened to draw up an account of their journey, and they undertook simultaneously, the former a large publi-

cation on the Zoology, and the latter a similar one on the Botany of Brazil. Unfortunately the health of M. Spix had suffered severely from the tropical climate and the fatigues of the expedition. He died in a very few years after his return; though not till he had completed five works in folio and in quarto, comprising the most important classes of the Animal Kingdom. From that time the whole burden fell on the shoulders of M. de Martius, who singly executed the second and third volumes of the 'Narrative of the Journey,' and who published (besides the botanical works which I shall shortly mention) the 'Fishes,' with the assistance of M. Agassiz, and the 'Insects' with the help of M. Perty. Such were his activity and his tact, that he inspired his fellow-workers with his own zeal, and while sacrificing his private fortune, he roused the interest of princes and the public, and produced in thirty-five years a series of publications of the highest class of merit. A glance at these works will show that this statement is no exaggeration.

The Narrative ('Reise in Brasilien') consists of three quarto volumes, accompanied by a highly curious atlas in folio. The frontispiece of this atlas, which M. de Martius published with the second volume, is characteristic of the author, and of that brilliant epoch when Munich was first adorned with monuments, and became an Italian city north of the Alps: it is a work of art, showing the universal ("*humanitaire*") and yet fanciful genius of Germany. Those who know Kaulbach's grand composition of the Tower of Babel will understand my description. The Past and the Present of South America are allegorically represented. The Equator, under the image of a Divinity, presides over the scene; with one hand he commands the outpouring of the copious waters which are to form the Rivers Orinoco, Amazon, and La Plata; in the other he holds a gigantic kind of lens, by which he concentrates the rays of light on a Goddess, who typifies young America; she, leaning against the Andes, appears as if amazed at her own strength, and but little disposed to use it; beneath her, gnomes wielding mining-tools work in the earth; and all around her a multitude of plants and animals peculiar to South America, display in their abundance the double energy of heat and moisture. At the foot of the page the history of America is portrayed in a very striking manner: warriors, armed with helmets and cuirasses, pursue on horseback, accompanied by blood-hounds, the miserable natives, who fall before the swords and muskets

of their conquerors; while, in the further recesses of the forests, Indians are seen killing and eating wild animals, among them a tapir, which they have hunted. The peculiar aspect of the Caucasian and American race is carefully marked. From amid these scenes of bloodshed and strife rises, in different guise, the actual state of America, represented by a female, the daughter of Europe, who holds a book open on her lap, and in her hand a caduceus, the emblem of Peace, while shepherds and agriculturists, of European descent, stretch out the hand, to implore her protection and bounty. This picture, composed by the illustrious Cornelius, is engraved by his pupil Stilke.

Similar delineations exist in M. de Martius's works, and give proof of his poetical turn of mind, to which, in composition, the German tongue affords many facilities; for it is peculiarly adapted to the narrative of a journey, and its abrupt transitions convey with much force the alternations of the traveller from security to peril, from the narrow and monotonous valley to the torrent's shore or to the mountain's top. In M. de Martius's style, the topographical and statistical details of the journey are diversified with descriptions, as elegant and far more truthful than those of Châteaubriand. I am not an adequate judge of German composition; but I have seen quotations from his pages, as specimens of elegant prose, and I know that the illustrious Goethe admired many of the passages extremely. The 'Narrative of the Expedition' points out many important facts in botanical geography; but it contains neither descriptions nor figures of plants, these being destined to form other more extensive and difficult works, in which M. de Martius was so happy as to obtain the assistance of highly eminent fellow-workers.

The 'Nova Genera Species Plantarum Brasiliensium' consists of minute descriptions, and of 300 plates, carefully executed in the then novel style of *engraving* on stone. The first volume is by Zuccarini, that accurate botanist, so early lost to science: the other two are by M. de Martius. In the second volume are a great many *Amaranthaceæ*, a Family which M. de Martius particularly affected; in the third many new *Gesneriaceæ* and highly curious *Vochysiaceæ* and beautiful *Melastomaceæ:* the publication of the latter was peculiarly opportune, being at the very time when De Candolle was describing Martius's species of this Family in the third volume of his 'Prodromus.' The 'Nova Genera' includes about 350 new species and 66 new genera; but it is the sin-

gularity of the forms, the perfection of the analyses, and excellence of the descriptive matter, which chiefly distinguish the book. The plan was analogous to that of Humboldt's 'Nova Genera,' edited by Kunth, M. de Martius possessing an advantage over the latter able botanist in being the owner of the very plants which he describes, and in having a large number of good specimens at his command. The analyses, which were executed at Munich, by Minsinger and Prestele, are superior to those of Turpin, in being more highly magnified and the details completer, including the embryo and the pollen-grains. Doubtless Kunth and Turpin were the great analysts of their day, but Turpin began to be excelled by other artists, none of whom however equalled for perfection the two Brothers Bauer.

The volume, which appeared between 1828 and 1834, on the Cryptogamic Plants of Brazil, displayed still more forcibly the talent of the Munich artists. The Ferns, described by M. de Martius, are preceded by an admirable dissertation on the anatomy of the stems of the Tree-Ferns, whose structure was then hardly known, by M. de Mohl, whose eight plates are excellently done; indeed the delineations and descriptions are good throughout the volume.

(*To be continued.*)

On Papyrus, Bonapartea, *and other Plants which can furnish* Fibre *for* Paper-Pulp.

[The Chevalier Claussen has published the following interesting notices relating to these plants.]

The paper-makers are in want of a material to replace rags in the manufacture of paper; and as I have paid attention to the subject, I proceed to communicate the result. First, however, I will explain what is required: viz. a cheap material, with a strong fibre, easily bleached, and procurable in an unlimited quantity. I shall now enumerate a few of the substances which I have examined in my researches for a proper substitute for rags.

Rags, containing about 50 per cent. of vegetable fibre, mixed with wool or silk, are considered useless by the paper-makers, and are yearly burnt, to the amount of several thousand tons, in manufacturing prussiate of potash. By the simple process of boiling these rags in caustic

alkali, animal fibre is dissolved, and the vegetable fibre becomes available for making white paper pulp. *Surat*, or *Jute*, the inner bark of *Corchorus Indicus* (?), affords a paper-pulp of inferior quality, and with difficulty bleached. *Agave*, *Phormium tenax*, and *Banana*, or *Plantain* fibre (Manilla Hemp), are not only costly, but it is almost impossible to bleach them. The *Banana* leaves contain 40 per cent. of fibre. *Flax* would replace rags in the manufacture of paper, were it not for its high price and scarcity, due, partly to the War, and partly to the injudicious way in which it is cultivated. Six tons of *Flax straw* are required to give one ton of Flax fibre; and by the present mode of treatment all the woody part is lost. By my process the bulk of *Flax straw* is lessened by partial clearing before retting, whereby 50 to 60 per cent. of shoves (a most valuable cattle food) are saved, and the cost of the fibre reduced. By the foregoing statement it will be seen that the *Flax plant* yields only 12 to 15 per cent. of paper-pulp. All that I have said of Flax is applicable to *Hemp*, which produces 25 per cent. of paper-pulp. *Nettles* afford 25 per cent. of a very beautiful and easily bleached fibre, *Palm-leaves* 30 to 40 per cent., but not easily bleached, and the *Bromeliaceæ* 25 to 40 per cent. *Bonapartea juncoidea* (an *Agave geminiflora ?*) contains 35 per cent. of the most beautiful vegetable fibre known, which is not only available for paper-pulp, but for all manufactures in which Flax, Cotton, Silk, or Wool are used. It appears that this plant exists in great quantities in Australia (?); and it were highly desirable that our manufacturers should import a large quantity of it. The only preparation it requires is to be cut, dried, and compressed, like hay; the bleaching and finishing may be done here.

Ferns give 15 to 20 per cent. of fibre, hard to bleach, and *Equisetum* the same quantity, easily bleached, but of inferior quality. The inner bark of the *Lime-tree* affords an easily bleached, but not very strong fibre. *Althæa* and many *Malvaceæ* yield 15 to 20 per cent. of paper-pulp. Stalks of *Beans*, *Peas*, *Hops*, *Buckwheat*, *Potatoes*, *Heather*, *Broom*, and many other plants, contain 10 to 20 per cent of fibre; but the extraction and bleaching present difficulties, which will probably forbid their use. The straws of the *cereals* cannot be converted into white paper-pulp after they have ripened their seeds, the joints or knots of the stalks having then became so hard as to resist all bleaching agents. To produce paper from them, it would be needful to cut them green, before the grain appears,—a *probably* disadvantageous plan.

Many *Grasses* contain 30 to 50 per cent. of fibre, not very strong, but readily bleached. Of our indigenous Grasses, *Rye-Grass* gives 35 per cent. of paper-pulp, *Phalaris* 30, *Arrhenatherum* 30, *Dactylis* and *Carex* the same. Several *Reeds* and *Canes* contain 30 to 50 per cent. of fibre, easily bleached. The stalk of the *Sugar-cane* gives 40 per cent. of white paper-pulp. The wood of the *Coniferæ* affords a fibre adapted for making paper-pulp,—an accidental discovery of mine, when manufacturing Flax cotton in my model establishment at Stepney, in 1851. I remarked that the Pine-wood vats, in which I bleached, were rapidly decomposed on the surface into a kind of paper-pulp. I collected some, and sent it to the Great Exhibition; but it failed to excite attention, because the want of paper-stuff was not then felt. The leaves and top branches of the *Scotch Fir* give 25 per cent. of paper-pulp, and the shavings and saw-dust of its wood, 40 per cent. The expense of reducing to pulp and bleaching the pine-wood, will be about thrice as much as that of bleaching rags.

As none of the above substances or plants would fully satisfy, in all points, the wants of the paper-makers, I pursued my researches, and at last remembered the *Papyrus* (the paper-plant of the ancients), which I examined, and ascertained it to contain about 40 per cent. of strong fibre, excellent for paper, and *easily* bleached. The sole point which was not quite satisfactory is the question of abundant supply, the plant being confined to Egypt (?)*: I therefore turned my attention to the plants of this country, and had the satisfaction to find that the *Common Rushes* (*Juncus effusus* and others) contain 40 per cent. of fibre, quite equal, if not superior, to the Papyrus fibre, and a perfect substitute for rags in the manufacture of paper, and that one ton of Rushes contains more fibre than two tons of Flax straw.

A Letter from MR. J. E. TEYSMAN, *Chief Gardener of the Botanical Garden, Buitenzorg, Java, to* Dr. De Vriese, etc. etc., *on the Cultivation of* RAFFLESIA ARNOLDI, R. Br.

In November, 1854, I received from Bencoolen (Bangkahoeloe) a plant of *Cissus scariosa*, Bl., on the roots of which several plants, of

* Travellers report it as scarcely known in Egypt at the present day. It is frequent in Sicily (indigenous?) and abounds in Western tropical Africa.

different dimensions, of the *Rafflesia Arnoldi*, were growing as parasites. The stem of the *Cissus* had been cut off too short; and probably, from the removal and long journey, the development of the plant being impeded, it, as well as the parasite plants, died off. Among the *Rafflesiæ* however there was one that did reach maturity, and of which the ripe seeds were plainly distinguishable. I had these grafted on other *Cissus* roots, of two different species, as *Cissus scariosa*, Bl., having a flat, tape-formed stem, and *Cissus serrulata*, Rxb., having a round stem; upon both of which species, and perhaps on some others of this genus, it is to be found in a natural state; at least I have found *Rafflesia Patma*, Bl., on the island Noessa Kambanga, or both species close together. This grafting was effected very simply, by making a small incision in the bark of the thicker roots, and inserting in the opening a few seeds of *Rafflesia Arnoldi*, which were covered with a little earth and a few leaves. For a long time after the operation nothing extraordinary was to be seen on the roots; but the incision, although nearly grown over, is still visible. Lately, when revisiting the locality, I perceived very plainly that in different places near to, as well as far from, the incision, several young *Rafflesiæ* (from the size of a green pea to that of a hen's egg) were developed, so that we can now boast of having brought the *Rafflesia Arnoldi* into cultivation, which, considering the slow growth from the grafting until now, we may reckon will require our patience for the period of a year and a half, or a year at least, for the development of the plant. This experiment advances us a stride nearer to the knowledge of this very interesting Family of plants, and of their very intricate development. It is now proved that this plant may be raised from its seeds, but how that takes place in nature remains a secret. The very delicate and fine seeds must be forced upwards and downwards, between the bark and the white wood, and fixed in appropriate places by means of the sap; this appears plainly from the example before us, as the buds or young plants of the *Rafflesia* appeared both above and below the incision, and were at considerable distances.

It is not probable that the seeds of the dead plant are transferred to the stem of the *Cissus*, in the place where the mother *Rafflesia* had grown, as that spot is then covered with dead crusts of the remains of the dead plant, and thus seems to possess little aptitude for the taking up of seeds. This is not the case. Another source of the propaga-

tion must be sought for, which possibly may be, that the seeds of the *Rafflesia*, after the dissolution of the plant, scattered through the woods and forced into the ground by the rain, are taken up by the fine hair-roots of the *Cissus*. It appears to me more probable that this propagation and grafting is effected by insects, which, on the dissolution of the plant, leaving it on account of its disagreeable smell, use these seeds, and transfer them undigested to the roots or subterranean stem of the *Cissus*, and deposit them in some fissure of the bark. From the situation of most of the *Rafflesiæ*, we should determine that this was done by some insect living underground, as the greater number of the buds are found on the thinner roots, growing wholly underground, although I have seen some few that have been developed a few feet above the soil and on the stem. If however we take into consideration that the seeds may be shifted to a great distance from the place of grafting, by the tissue of cells, or between the bark and wood, then it may be indifferent where the grafting takes place; and it may be effected by winged insects, such as I have frequently seen come off the stem of the plant while in process of dissolution. Still something else must be borne in mind, viz. that it is known that *Rafflesiæ* are *diœcious*, that is, masculine and feminine. How does the impregnation happen? This may also be done by insects, if two plants of different sexes are at the same time in a state of development: let this be so.* Such cannot have been the case with the plant received from Bencoolen; though it came to us expanded, it was not open when it was dug out of the woods, since the plant has only a few days to live in a flowering state, and it seems almost impossible that the impregnation can take place before the opening, because the leaves all fit so closely upon each other, that no insect could possibly move between them; and yet the seeds of this most probably unimpregnated plant have all come up well here. Lastly, another consideration arises: let it be admitted that the seeds are well impregnated by some means or other, how is it possible that they ripen in so short a time? for only a few days after blossoming the whole plant decays. If the culture of this plant be extended, which there is no reason to doubt, future observations, under a regular watching of the plants in gardens, may possibly clear up much that is dark and unknown, and of what it is impossible to observe in the wil-

* The question still arises, by what way or means is it possible for the pollen to penetrate the cavities of the ovary?—De V.

dernesses in which these plants present themselves. For this however patience and practice are necessary. The period is not far off when these plants may be cultivated in European gardens with success, if they are once imported and strong plants of *Cissus* are raised on which the grafting is to be made afterwards. These plants must be raised in large square or oblong frames, that the roots which are to serve as bases for the *Rafflesiæ* may spread strong enough. In the same manner must they be imported.

Report of a Committee appointed to investigate the best method of Making and Recording Observations on the period of LEAFING, FLOWERING, *and* FRUITING *of Plants, held during the Meeting of the German Association of Naturalists, at Vienna, on the* 19*th of September*, 1856.

In consequence of a proposal made in the meeting of the Botanical Section on the 18th of September, the following gentlemen assembled in the hall of the Botanical Section, to discuss their views respecting phænological observations, and to agree upon a uniform plan, by which these might hereafter be simultaneously carried on:—Dr. Ferd. Cohn, of Breslau; Dr. Karl Fritsch, of Vienna; Dr. A. E. Fürnrohr, of Regensburg; E. Hampe, of Blankenburg; F. Hazslinszky, of Eperies; Professor Oswald Heer, of Zürich; L. von Heufler, of Vienna; Herm. Hoffmann, of Giessen; Dr. A. Kerner, of Ofen; Dr. A. Pokoray, of Vienna; Dr. Ph. L. Rabenhorst, of Dresden; Dr. Siegfried Reissek, of Vienna; Dr. Adalbert Schnitzlein, of Erlangen; and Dr. Otto Sendtner, of Munich.

Professor Karl Nägeli, of Zürich, was chosen president of this Meeting; and Professor Hoffmann opened the proceedings by giving his ideas on the phænological observations which have hitherto been made. These presented no uniformity, either in their methods or in their objects; which is the more to be regretted, since the number of observers is daily increasing. The object usually sought is to re-establish some relation between climates and the period of flowering,—an attempt which, in the present state of our knowledge, is premature. A further reason why all such attempts have hitherto led to no results, lies in the want of uniformity amongst the observations, and in too many plants being made the subjects of observation. Professor Hoffmann suggested therefore that a smaller number of plants should be selected, and such

only as are widely-spread and conspicuous; further, that a single species, and always the same individual, should be chosen, and the most favourable station for observations fixed upon.

Professor Heer agreed with the views of the first speaker, and stated that in Switzerland thirty-four places had been fixed on for phænological observations, the recently completed account of which he laid before the meeting. He considered of great importance the records of the times free of frost and snow, and of the depth of earth frozen, which had been taken account of in the work lying before him.

Dr. Cohn considered the most important object of phænological observations to be the fixing of the mean times of development at the places of observation, for which indeed a long series of years would be necessary.

E. Hampe perfectly agreed with his predecessor, and drew attention to the fact, that in making choice of the plants to be experimented on, particular attention should be paid to those whose most important stages of development fall at that time of the year of which the temperature most nearly approaches the mean annual temperature. He proposed therefore, in the first place, to determine the places where phænological observations should be carried on.

Professor Sendtner considered it advisable for the present to confine the observations to those places only which now possess meteorological stations, against which Professor Hoffmann spoke. The latter was of opinion that the present meteorological stations are still in such a condition as will not justify any comparison between climates and the periods of flowering plants.

L. von Heufler requested Dr. Fritsch, who had made such observations the study of his life, to communicate to them his experience on this subject.

After Dr. Fritsch had explained some of his views, he proposed that the whole body of gentlemen who had composed instructions for phænological observations, should agree in the composition of one common paper of instructions, which proposal was also agreed to.

In the first place the catalogues of Messrs. Cohn, Fritsch, and Hoffmann, of the plants which these gentlemen had recommended for observations, were united, and the plants were taken in alphabetical order one after another.

The following species of plants were fixed upon:—*Acer platanoides*,

L., *Æsculus Hippocastanum*, L., *Berberis vulgaris*, L., *Catalpa syringæfolia*, Sims, *Colchicum autumnale*, L., *Convallaria majalis*, L., *Corylus Avellana*, L., *Crocus vernus*, L., *Cytisus Laburnum*, L., *Daphne Mezereum*, L., *Fagus sylvatica*, L., *Cornus mascula*, L., *Fraxinus excelsior*, L., *Fritillaria imperialis*, L., *Hepatica triloba fl. cærul.*, *Hordeum vulgare, hybernum* and *æstivum*, *Leucojum vernum*, L., *Lilium candidum*, L., *Prunus avium*, L., and *P. Padus*, L., *Pyrus Malus*, L., *Ribes Grossularia*, L., *Ribes rubrum*, L., *Robinia Pseudacacia*, L., *Sambucus nigra*, L., *Secale cereale*, *hybernum* and *æstivum*, *Sorbus Aucuparia*, L., *Syringa vulgaris*, L., *Tilia parvifolia*, Ehrb., *Triticum vulgare, hybernum*, L., *Vitis vinifera*, L.

A proposal of Rabenhorst, also to include certain *Cryptogams* in the observations, was considered premature, and therefore negatived.

In the plants under examination the following phases should be observed :—

1. The first appearance of the surface of the leaf.

2. The first fully-expanded blossom, the pollen appearing prominent.

3. The first ripe, normal fruit, without worm-hole, at the beginning of the harvest of each sort of grain.

4. General decoloration of the leaves.

Remarks on the duration of vegetation with reference to the weather, namely, the first and last frosts, and the duration of the snow.

Observations are also to be desired on the general period of ripening of flowers and fruits. In observations continued for many years upon leafing, flowering, and fruiting, the same tree, or the same group of similar plants, the same meadow, etc., must always be taken for observation.

(Signed) KERNER; REISSEK; POKORAY.

Note on DICHILANTHE ZEYLANICA; *by* G. H. K. THWAITES, Esq.

Owing to my overlooking a mistake made by the native draftsman, this species is represented, in Pl. VIII. *A*. fig. 1, of the present volume, as being furnished with interpetiolary stipules; such is not the case. The description of the plant (at p. 270), explains the true structure.

G. H. K. T.

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Vincent Brooks Imp

Note on the Genus DOONA; *by* G. H. K. THWAITES, Esq.

To the description of this genus, published in Vol. IV. of this Work, page 7 (1852), may be added the following character of the embryo:—

Embryo cotyledonibus foliaceis, valde inæqualibus; harum maxima inter stratum oleoso-albuminosum contorto-convoluta, in germinatione inclusa; altera brevissima, in germinatione sæpissime emergente.

The above shows the genus *Doona*, Thw., to be abundantly distinct from *Hopea*, Roxb., the cotyledons of which, like those of *Vatica*, L., are subequal, very fleshy, and emergent in germination.

Seven species of *Doona* have now been detected in Ceylon.

BOTANICAL INFORMATION.

Valuable American Herbarium for Sale.

This Herbarium has been collected, during many years' residence in the United States, by John Carey, Esq., who was actively engaged there in botanical pursuits, but who is now about to give up his house in London, in consequence of a recent severe bereavement in his family.

The Collection includes the indigenous plants of the North American Continent, from Canada to California, and Northern Mexico, containing many of the recent discoveries in the latter countries; and, with respect to those of the Northern and Middle States, it is almost complete, and no less so, to a very great extent, in respect of the Flora of the Southern and Western States. The specimens are unusually full and fine, comprising the best selections from very numerous collections made in all parts of the Union, and amounting, it is believed, to upwards of 50,000; the whole very neatly and carefully cemented down upon upwards of 12,000 handsome, full-sized, and heavy sheets of white paper, arranged in appropriate genera sheets of stiff coloured paper.*

* Notwithstanding, however, the size of the paper, the collection is capable, without inconvenience, of being, if desired, incorporated with any other *Hortus Siccus*; and we know, from those best competent to judge, that this is one of the most remarkable, most complete and faultless of American Herbaria, that has ever been formed, and the most authentically named.

The Herbarium is contained in two large cabinets of American Black Walnut, with glass doors, and appropriately fitted up for the reception of the sheets. To a student of American Botany this Collection would be very valuable, not only for the geographical range of the species, to which great care has been devoted, but also as being of absolute authority as to the species of Torrey and Gray, and other American authors, with whom the Collector was in habits of the closest intimacy.

To avoid the expense and inconvenience of removal, the Herbarium would be sold at a very moderate price to an applicant before Christmas. For further particulars apply to the Proprietor, Mr. J. Carey, 8, Warnford Court, Throgmorton Street, London.

Odal Oil.

Our valued correspondent, the Rev. E. Johnson, M.A., of Pallum Alleppu (coast of Cochin), South India, has sent, together with many excellent dried plants of that country, a bottle of the *Odal* (or, as often wrongly spelt, *Adul*) *Oil*, used there externally, with other oils, for rheumatism, together with a bottle of the fruit. The Oil is extracted from the seed, and is the product of *Sarcostigma Kleinii*, of which specimens are also sent in the box. "There was a curious mistake," Mr. Johnson writes, "about this in the Report on the Oils of the Madras Exhibition (copied in a note in our Report on the Paris Exhibition of 1855, p. 25): I was granted 'Honourable Mention' for having identified '*Poorana Oil*' as the product of the *S. Kleinii*, while the *Odal Oil* was said to be *still unknown*. Now I do not know the *Poorana Oil* at all. The only meaning I can attach to the word is *Flower Oil;* while, in fact, I *indentified* the *Odal Oil* as the product of *S. Kleinii.*"

Another little error is copied in the Report of the Paris Exhibition (p. 30, note) from the Report on the *Gums* and *Resins* of the Madras Exhibition, viz. that the *Mutty Pul* is a resinous exudation "used for incense." Mr. Johnson has kindly sent us specimens of the bark of the Mutty Pul (*Ailantus Malabarica*), with its curious resinous grains, but they are not used as incense in any part of the Cochin country.

Müller's European Herbarium.

Mr. Müller, who is the Conservateur of the herbarium of M. De Candolle, at Geneva, where he has had great opportunities of determining accurately and from the most authentic sources the species of plants (of which he has fully availed himself), and being desirous of devoting more of his time to the study of Cryptogamic Plants, has decided on disposing of his own private hebarium of Phanerogamic Plants. The following notice will give some idea of this extensive and well-preserved collec-lection:—

"L'herbier de Phanérogames du Soussigné, offert aux amateurs, se compose de près de 5000 espèces spontanées de la Suisse, de l'Allemagne, de la Hongrie, du Piémont, de la Corse, du midi et de l'ouest de la France et des Pyrénées. En terme moyen chaque espèce est représentée par 2 exemplaires (de deux localités), et chaque exemplaire se compose de 1, 2, 3, pieds ou rameaux d'une plante. La flore du Synopsis de Koch y est à peu près complète; le peu qui manque est surtout de l'Istrie, ou ce sont des formes hybrides. Dans les Ranuncul. Crucif. Legumin. Umbellif. Composit. etc. on a mis beaucoup de soins pour avoir les fruits. Le tout est très bien conservé et les exemplaires sont généralement très beaux. Le prix en est de 100 liv. sterl. (Lettres affranchies.)

"T. Müller, Conservateur de l'herb. DC.,
Cour St. Pierre, à Genève."

Mr. Spruce's Collections.

More collections of plants have lately been received from this enterprising botanist, from the vicinity of Tarapoto, in Peru. These, together with what will immediately follow, are perhaps the last of a truly tropical character that are to be expected by the subscribers; for Mr. Spruce informs us that he intends to proceed directly to the mountains, on his way to Quito, the capital of Ecuador, whose position, by the side of the great mountain Pichinca (itself at an elevation of 9000 feet above the level of the sea), renders it perhaps one of the finest localities in the world for the Cryptogamist, and as the researches of Dr. Jameson would lead us to expect.

M. Huet du Pavillon's *Plants of Sicily, etc.*

M. Huet du Pavillon has informed us of his and his brother's return from their excursions during the year 1856, in Sicily, Calabria, and the Abruzzos, bringing collections with which they are well satisfied. These will be distributed among the subscribers as soon as they are properly arranged and named.

They also wish the public to be informed that they have still at their disposal collections of from 300 to 400 species from their Sicilian journeys, undertaken in 1855. The price of these and of the present year's collections, are 25 francs the century to non-subscribers.

The address of M. Huet du Pavillon is "Rue Verdaine, n. 266, Geneva."

To the Editor of the 'Journal of Botany.'

Conceiving that in Natural History, as in many other things, it is never too late to retract an error, however long it may have been persisted in, I think it only fair towards Mr. Neisler, that I should beg leave to recall in your Journal the remarks on the subject of *Arachis* and *Stylosanthes* which I made in your 7th vol., pages 177 to 179. Notwithstanding the care with which I had previously examined the flowers of these plants, I now find that, in *Stylosanthes* at least, I was misled by the remarkable changes which take place in the base of the style immediately after fecundation; and although there are some points which I cannot yet clearly comprehend, I readily admit that my former views were erroneous.

George Bentham.

NOTICES OF BOOKS.

Hooker, Dr. Joseph Dalton: Flora *of* Tasmania; *being the Third Series of the Botany of the Antarctic Voyage.* Parts I.–III. 4to. London, 1856.

We call attention to this valuable work, not for the purpose of offering any extended remarks or criticisms upon it, but mainly to announce

its being in course of publication (and not tardily, for three stout fasciculi, each of eighty pages, and twenty beautiful plates from the pencil of Mr. Fitch, have appeared), and to express our satisfaction that at length our country is beginning to feel the importance of making known to the world the vegetable productions of her colonies. "Floras" of the kingdoms and empires of civilized Europe (Spain alone excepted) are common enough; and there is scarcely a country in the globe of which *detached* portions have not been explored, and their vegetable riches more or less accurately described and illustrated; but, till within these few years, there has not existed, as far as we know, any such Flora of an extra-European colony, whether under the British or foreign sway, as could be practically useful to a resident or casual visitor who might wish to study Botany. It was the researches and collections of the lamented Sir John Franklin, of Sir John Richardson and Drummond, and the several Arctic voyagers and travellers, which formed the groundwork of the 'Flora Boreali-Americana, or the Botany of the British Possessions in North America,' which appeared in 1840, "under the auspices of the Lords Commissioners of the Admiralty." They procured the means for forming the needful collections, and provided the necessary funds for carrying out the publication,—two volumes, 4to, with 248 plates and an excellent map.

Again, in 1839, the Admiralty sent out an expedition, under Captain Sir James Ross, to explore the Antarctic and adjacent regions; and thence originated, under the same authority, the important botanical series termed 'The Botany of the Antarctic Voyage,' of which the work now under consideration is the third and last section. In 1844–1847 appeared the first portion or series,—two 4to volumes, with 198 coloured plates, divided into two sections: the first comprising the vegetation of certain islands, British Possessions, though they can scarcely said to be colonized, viz. Lord Auckland's Group and Campbell's Island; and, secondly, of Antarctic Regions (*exclusive* of Lord Auckland's Group and Campbell's Island), and embracing our most southern colony, viz. the Falkland Islands. The second section was confined to a rising and now highly important colony, 'The Flora of New Zealand,' which was published in 1853–1855, with 130 plates. This is now followed by the third and last series, describing the vegetation of an equally valuable colony in the southern hemisphere, and which heads this article, viz. 'The Flora of Tasmania,' or, as it has hitherto

been usually called, Van Diemen's Land. This will extend to two volumes, and will be illustrated with 180 plates.

Such are briefly the important services which science owes to the Lords Commissioners of the Admiralty. But they are far from all. Rarely is a surveying voyage sent out, but it is, and has been ever since the days of Cook, accompanied by one or more practical men of science, whose discoveries have been turned to good account. Nor have our Chief Secretaries for the Colonies been backward in encouraging, where it seemed really needful, the formation of Botanic Gardens; and their powerful influence, and that of the Governors themselves, has been felt in many ways in connection with the Kew Gardens and Museum, and is exemplified at this moment in the researches of Dr. Mueller in North Australia, as noticed in the pages of the present number of our Journal. Equally deserving of praise and acknowledgment are the services of the Head and various Chief Officers of the Foreign Office; they embrace every opportunity to promote science in foreign countries: witness the several exploratory journeys into Africa, the results of which are more and more important every day. In that Office our valued friend, George Lenox-Conyngham, Esq., is preparing a series of printed *Instructions* for the study and collecting of objects of Natural History, to be largely distributed among our Ministers and Consuls and the several political agents abroad, the results of which cannot fail to prove valuable.

We turn now to another powerful governing power, namely the Honourable Court of Directors of the East India Company, whose encouragement in former years to the cause of science, and of botany in particular, called forth our hearty commendations in a memoir on the subject, published in the 'Botanical Miscellany,' vol. ii. p. 90, as follows:—"For a long series of years the East India Company have, with a liberality which does them the highest honour, manifested a disposition to foster this branch of science (botany); well aware how much we owe to the vegetable creation for our food, our clothing, our ships, our buildings, and innumerable articles connected with the arts, domestic economy, and medicine; so that commerce might in consequence be materially benefited by an increased knowledge of the vegetable productions of India." Some notice then followed of the noble Botanic Garden of Calcutta (no less than five miles in circumference); of the vast collections of plants made at the Company's expense; of the

many publications of Roxburgh, Hamilton, Wallich, Wight, etc., patronized and fostered by them (especially the 'Flora Indica' of Dr. Roxburgh). All this encouragement was bestowed at a time (1832) when a great portion of their possessions was unexplored; while at the present day, a work which we will take leave to say, though of little pretensions, yet of the highest character and usefulness, is nipped in the bud, for want of that aid which is so entirely in the power, and so eminently to the interest, of the Company to give; we allude to the 'Flora Indica' of Drs. Hooker and Thomson, of which the first volume, octavo, of 565 pages (including the Introductory Essay, in English), accompanied by a most valuable and accurate map, prepared purposely to illustrate the physical geography of India and the botanical provinces, appeared last year, 1855. The work has been twelve months before the public, and has elicited encomia from the first botanists in Europe and in the United States; but the pecuniary loss to the Authors has been infinitely too heavy to justify their continuing the publication without that support which has, unsolicited, been so liberally given by our Government to the Colonial Floras already mentioned. It may not be uninteresting to our readers to be made aware of some of the circumstances that have attended this publication, and we propose to state them at a future period.

GRAY, DR. ASA: MANUAL OF THE BOTANY OF THE UNITED STATES (Second Edition), *including Virginia, Kentucky, and all parts of the Mississippi; arranged according to the Natural System.* (*The* MOSSES *and* LIVERWORTS *by* WM. S. SULLIVANT.) *With Fourteen Plates, illustrating the* GENERA *of* CRYPTOGAMIA. 8vo. New York: 1856.

This valuable contribution to the Botany of the United States is, the indefatigable and learned author assures us, designed as a compendious Flora of the northern portion of the United States, for the use of students and practical botanists. "The first edition,"* he continues, "was hastily prepared, to supply a pressing want. Its plan having been generally approved, has not been altered, although the work has been to a

* 'Manual of the Botany of the Northern United States, from New England to Wisconsin and south to Ohio and Pennsylvania inclusive (The Mosses and Liverworts by W. S. Sullivant);' etc. etc.

great extent rewritten. Its increased size (740 pages) is mainly owing to the larger geographical area embraced in it, being here extended southward so as to include Virginia and Kentucky, and westward to the Mississippi River."

This important volume exhibits two principal features: firstly, the increased number of species both of Phænogams and Cryptogams consequent upon additional geographical area included; and secondly, the very beautiful and numerous figures, executed, it would appear, by Mr. Sprague, of the genera of Ferns, Mosses, and Hepaticæ,—thus simplifying to a great extent the study of what must ever be reckoned among the most beautiful of Nature's vegetable forms. These Plates are nearly as valuable to the student of European as of American Cryptogamia, the genera of the two countries being very similar.

The Preface contains some brief interesting notices on the geographical distribution of plants within the given area; and the time, Dr. Asa Gray tells us, is not far distant "when, as the result, especially of the labours and investigations of Prof. Tuckerman upon our *Lichenes*, of the Rev. Dr. Curtis upon our *Fungi*, and of Prof. Harvey upon our *Algæ*, as well as of Messrs. Sullivant and Lesquireux upon our *Mosses*, all our Cryptogamia may be in a similar manner presented to the student in the form of a supplementary volume, separate from that comprising the phænogamous or flowering plants."

It is requested that the following corrections may be made in this Volume:—

Page 230, 7 lines from the bottom, *dele* (Plate XI. *A. B.*)

Page 231, line 19, and at line 25, *for* Tab. XI. *A. read* XII. *B.*

Page 231, line 7 from bottom, *dele* (Tab. XI. *B.*).

Page 232, line 1, *dele* Plate XI. *B.* and all that follows in that and the following line.

Page 257, at the end of line 7 *add* (TAB. XII. *A.*).

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